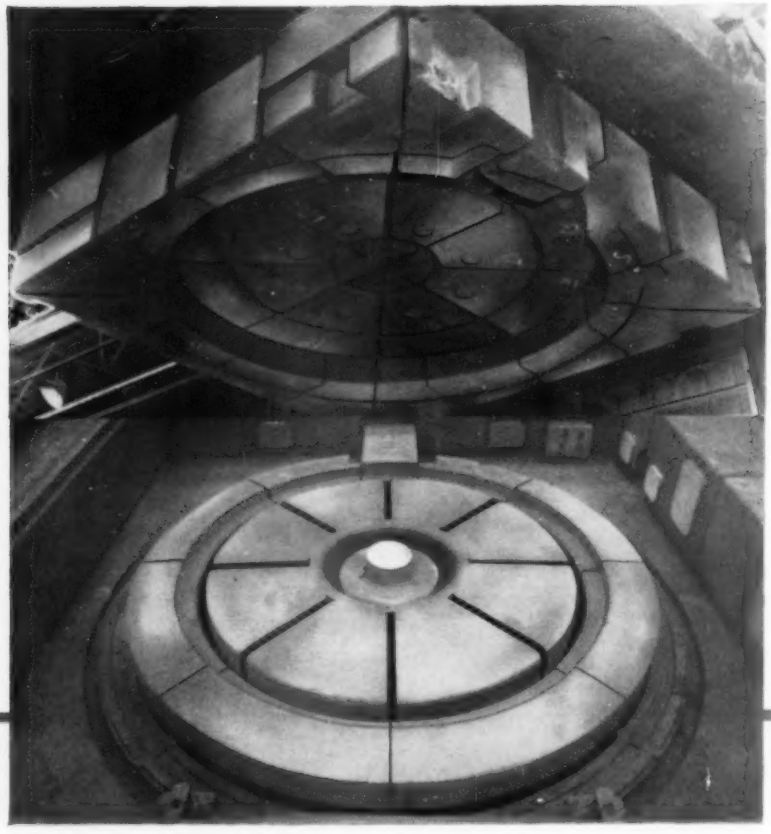
FOUNDRY
EST. 1902 TRADE JOURNAL
WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL
VOL. III No. 2338 SEPTEMBER 28, 1961
Registered at the G.P.O. as a Newspaper Offices: John Adam House, John Adam St., London, W.C.2
Single Copy 1/-. By Post 1/4. Annual Subscription, Home 52/-, Abroad 60/- (Prepaid)

Distributors of all types of Foundry, Hæmatite and Special Grades of...

PIG IRON

THOS. W. WARD LTD
Foundry Supplies Department
ALBION WORKS · SHEFFIELD
Telephone: 26311 · Telex 54-119

FS 44



These two photographs show the top and bottom parts of the mould before they are closed.

79 HOURS SAVED IN COREMAKING

This 14 ft. square casting for a George Richards' horizontal borer incorporates intricate cores. By using the Corovit cold-setting technique the accuracy of the cores is improved and coremaking time drastically reduced—from 180 to 100 hours. The immense strength of the core is well illustrated by the massive overhangs.

COROVIT is manufactured and sold in the U.K. solely by FORDATH, who prepay licence fees to Reichold Chemie A.G. of Switzerland. Reichold are the proprietors of British Patents 653,530 & 761,035. Thus foundries using COROVIT are automatically free from liability to suit for infringement of these patents when they use peroxide-group accelerators in their cold-setting work.

Photographs by kind permission of George Richards & Co. Ltd., Broadheath, Altrincham, Cheshire.

ASK FORDATH TO TELL YOU ABOUT **COROVIT** COLD-SETTING TECHNIQUE

THE FORDATH ENGINEERING COMPANY LIMITED, BRANDON WAY, WEST BROMWICH, STAFFS, ENGLAND
Telephone: West Bromwich 1665 Telegrams: Fordath Telex West Bromwich Telex No: 33415

Bastable

JACKMAN

for prompt deliveries of requisites and sundries

MARINITE CORE PLATES

ALL SIZES UP TO 10'-0" × 4'-0"
THICKNESSES ¼", ½", ¾", 1", 1¼"
LIGHT WEIGHT, STRONG, DURABLE, INEXPENSIVE

SHOT BLAST ABRASIVES

ROUND CHILLED SHOT
ANGULAR GRIT
ROUND STEEL SHOT
BLASTGRAIN—
AN ALUMINOUS ABRASIVE WITH CARBIDE CONTENT. NO FREE SILICA
ALL GRADES AVAILABLE

LADLES

STAMPED BOWLS
CARRYING SHANKS, SINGLE AND DOUBLE ENDED
CRANE LADLES, GEARED AND UNGEARED

RIDDLES AND TOOLS

SIEVES, BARROWS, BUCKETS, BELLOWS, SHOVELS, ETC.

CHAPLETS

MANY TYPES AVAILABLE, PRICES LOW
PERFORATED TINNED CHAPLETS, SPRIGS, POINTS, NAILS

MOULDING BOXES

ROLLED STEEL
JACKMAN FREMONT FLASKS AND JACKETS
HARD WOOD SNAP FLASKS

CORE GUM **PARTING POWDER**
CORE OIL **COAL DUST**
KORINE **PLUMBAGO**

FULL DETAILS WRITE TO

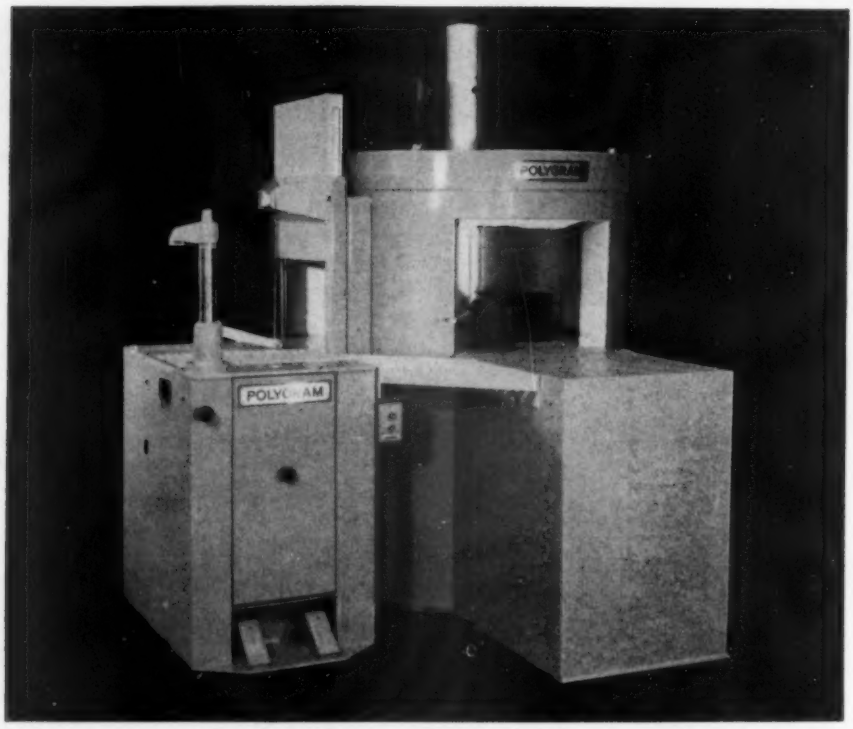
J. W. JACKMAN & COMPANY LIMITED
VULCAN WORKS, BLACKFRIARS ROAD, MANCHESTER, 3
TELEPHONE : DEANSGATE 4648-9 TELEGRAMS : BLAST MANCHESTER

A

The POLYGRAM 8 ✳

CMU SHELL COREMAKER

for Jobbing Foundries



Designed to bring all the economic and technical advantages of shell cores into *your* foundry, the latest Polygram CMU Shell Coremaker is the fruit of 12-years of continuous research by the only British Specialists in Shell Moulding and Coremaking. Note that the unit construction enables you to fit a CMU core blower or oven into your existing layout and to expand it into a full CMU Shell Coremaker at *your* convenience.

8 ✳ *Features of the Polygram CMU Shell Coremaker*

- ✳ Maximum Versatility
- ✳ Maximum Complexity-of-Core
- ✳ Minimum Handling
- ✳ Minimum Maintenance
- ✳ Maximum Quality
- ✳ Maximum Production
- ✳ Minimum Skill
- ✳ Minimum Heat

Designed by Foundrymen—Built by Engineers

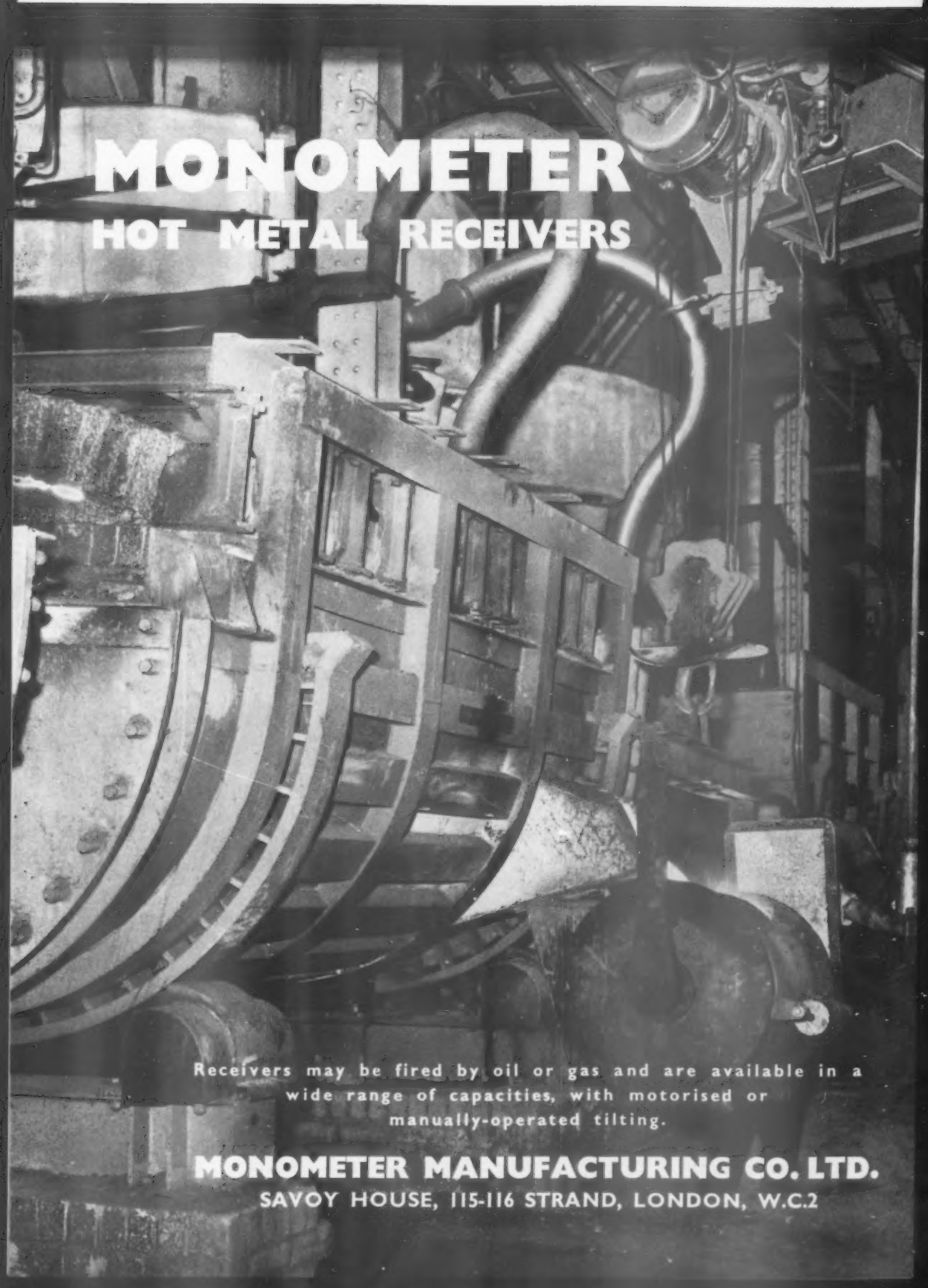
Write **NOW** for details to

Polygram *Casting Company Limited*

THE FIRST NAME IN SHELL MOULDING

SHERNFOLD PARK · FRANT · TUNBRIDGE WELLS · ENGLAND. *Telephone:* Frant 346.

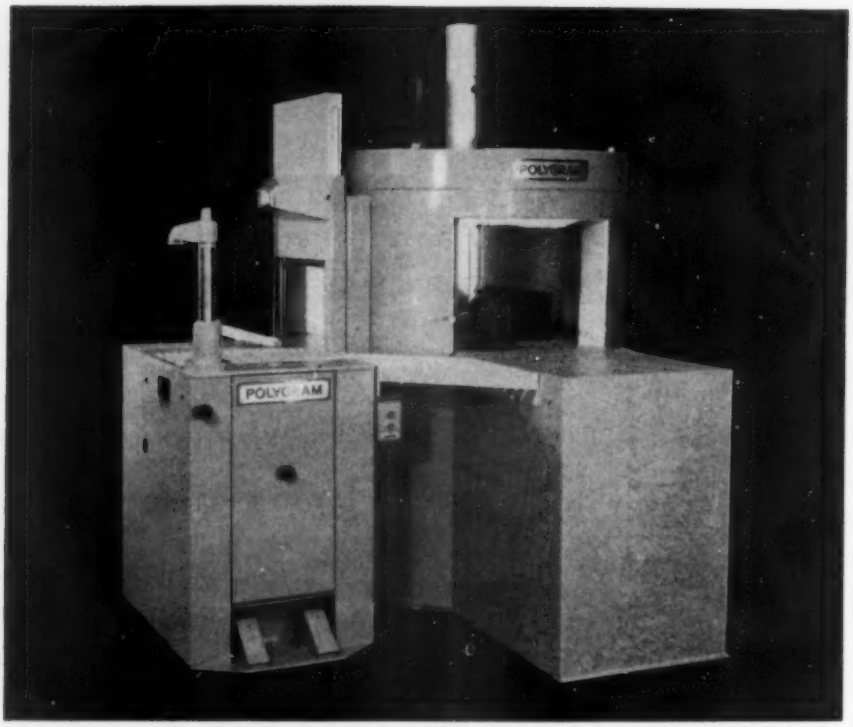
Serving the foundrymen of tomorrow—today


MONOMETER
HOT METAL RECEIVERS
Receivers may be fired by oil or gas and are available in a wide range of capacities, with motorised or manually-operated tilting.
MONOMETER MANUFACTURING CO. LTD.
SAVOY HOUSE, 115-116 STRAND, LONDON, W.C.2

The POLYGRAM 8*

CMU SHELL COREMAKER

for Jobbing Foundries



Designed to bring all the economic and technical advantages of shell cores into *your* foundry, the latest Polygram CMU Shell Coremaker is the fruit of 12-years of continuous research by the only British Specialists in Shell Moulding and Coremaking. Note that the unit construction enables you to fit a CMU core blower or oven into your existing layout and to expand it into a full CMU Shell Coremaker at *your* convenience.

8* *Features of the Polygram CMU Shell Coremaker*

- Maximum Versatility
- Maximum Complexity-of-Core
- Minimum Handling
- Minimum Maintenance
- Maximum Quality
- Maximum Production
- Minimum Skill
- Minimum Heat

Designed by Foundrymen—Built by Engineers

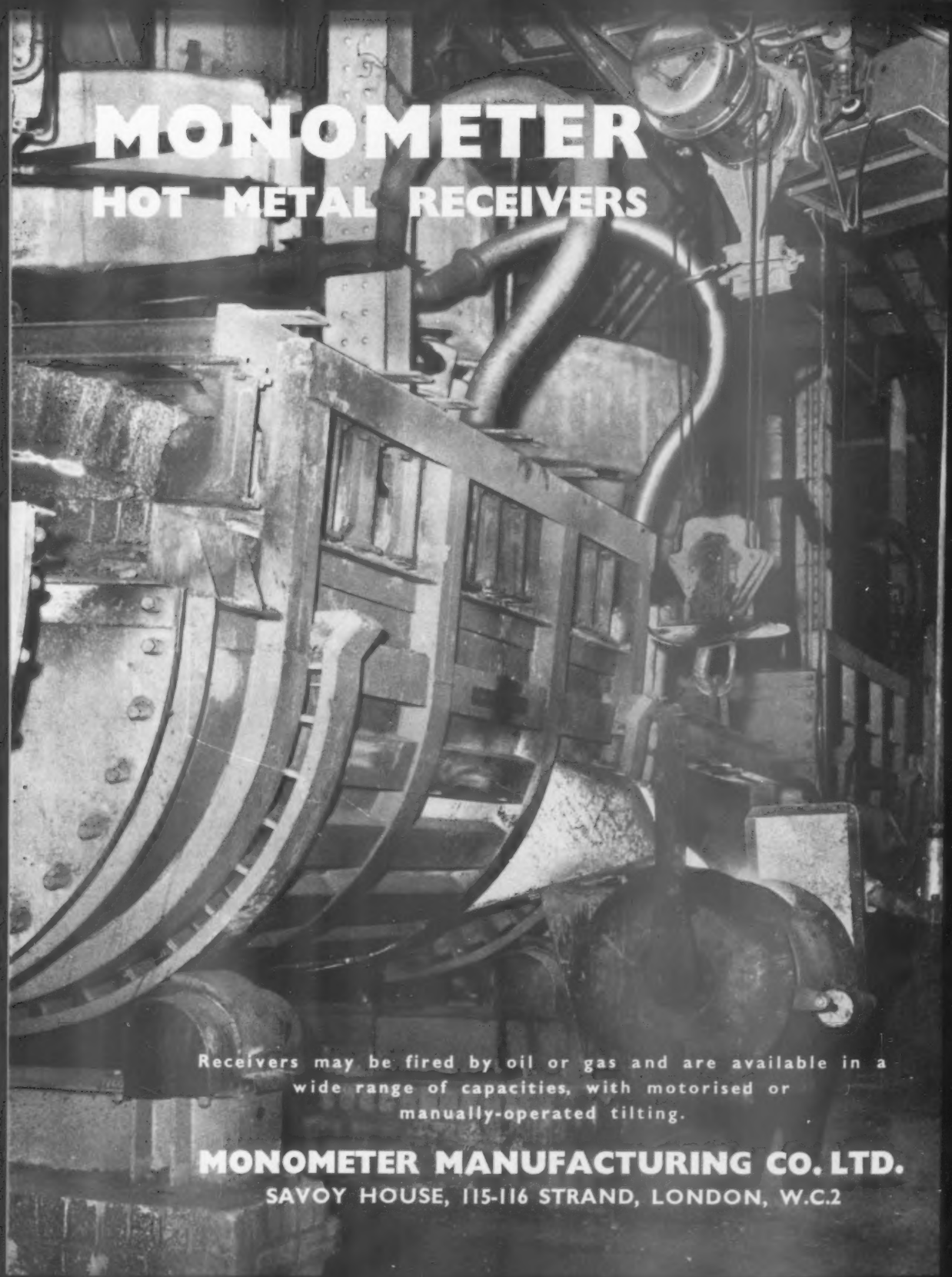
Write **NOW** for details to:

Polygram *Casting Company Limited*

THE FIRST NAME IN SHELL MOULDING

SHERNFOLD PARK · FRANT · TUNBRIDGE WELLS · ENGLAND. *Telephone:* Frant 346.

Serving the foundrymen of tomorrow—today


MONOMETER
HOT METAL RECEIVERS
Receivers may be fired by oil or gas and are available in a wide range of capacities, with motorised or manually-operated tilting.
MONOMETER MANUFACTURING CO. LTD.
SAVOY HOUSE, 115-116 STRAND, LONDON, W.C.2

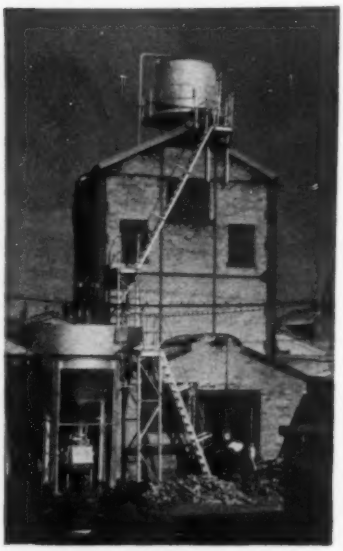
Coarse as grit . . .
fine as fume;

dust

If you want to control it, collect it, separate it, extract it, the people to get in touch with are Filter-Heat Ltd.

WHY?

For a very sound reason. They are not committed to any particular method of dust collection but are concerned with one thing only – the best way to trap a particular type of particle. It might be done with cyclones, cloth filters, wet collectors – or a combination of these. Filter-Heat makes them all. On a cupola, for example, they would recommend a water screen grit and spark arrester. The one illustrated here removes between five and six times as much grit and dust as the dry arrester it replaced. It also removes a considerable proportion of the sulphur in the gases. If you have a dust or grit problem; ring Leigh Lancs 72101 – or (in London) Abbey 3085. Filter-Heat take over from there.



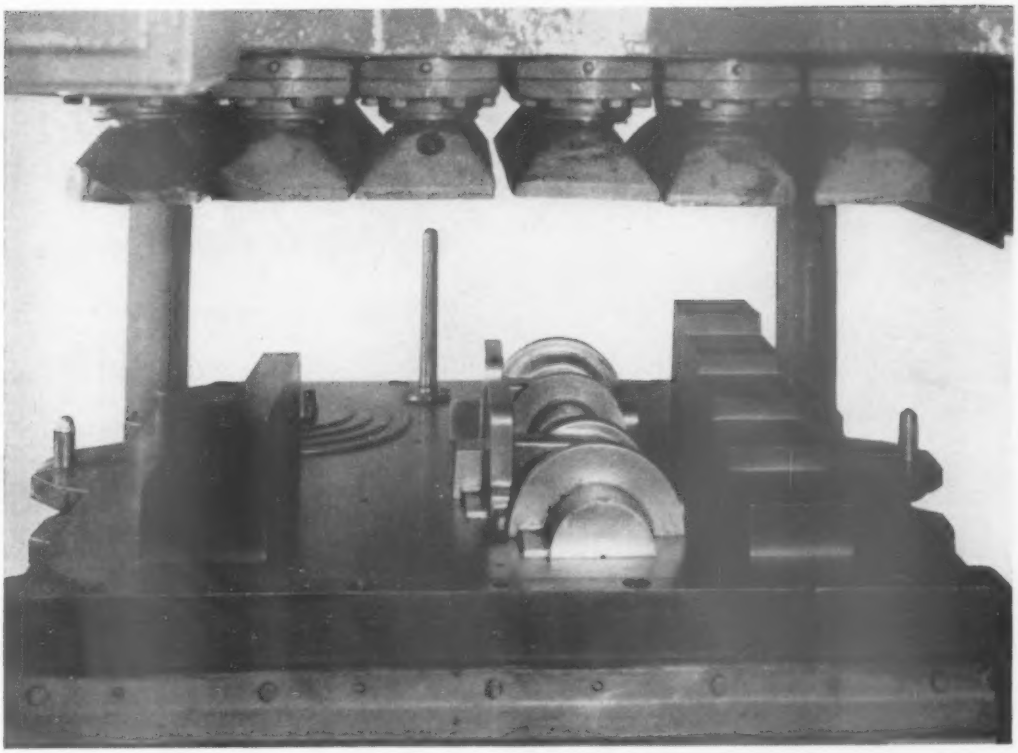
Cupola at Willenhall equipped with a Filter-Heat grit and spark arrester – at Monmer Foundry Limited in St. Annes Rd.

FILTER-HEAT LTD

(a subsidiary of Sutcliffe, Speakman & Co. Ltd)

GUEST STREET · LEIGH · LANCASHIRE

LONDON OFFICE: 2 CAXTON STREET · SW1



THE

HERMAN

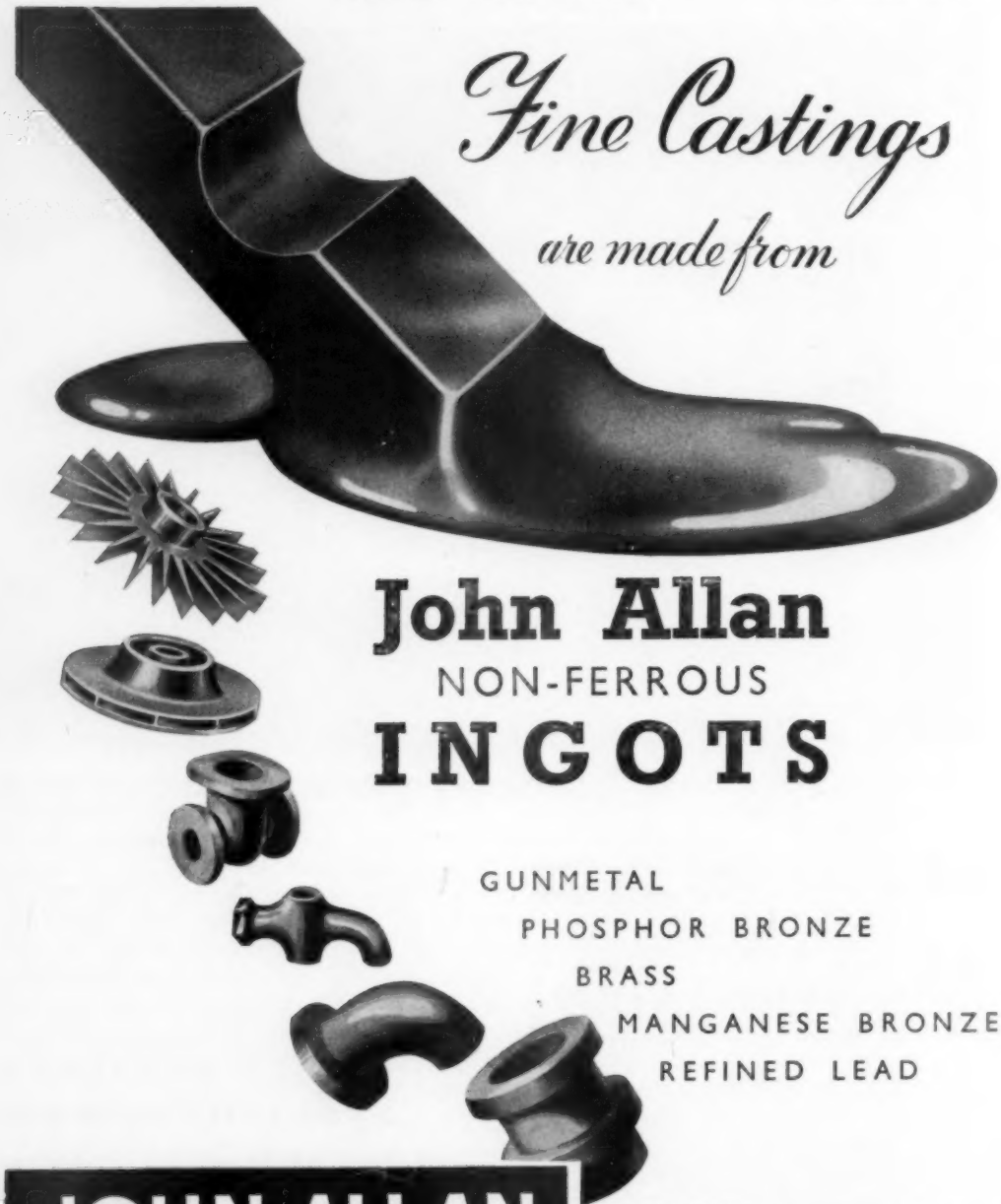
Moldmaster

(PATENTED)

A high pressure hydraulic squeeze machine . . . *with self contouring head* . . . . . .

Built in England by

PNEULEC LIMITED, SMETHWICK, Nr. BIRMINGHAM



Fine Castings

are made from

John Allan

NON-FERROUS

INGOTS

GUNMETAL
PHOSPHOR BRONZE
BRASS
MANGANESE BRONZE
REFINED LEAD

JOHN ALLAN
& CO. (Glenpark) LTD.
ESTABLISHED 1898

A MEMBER OF THE METAL INDUSTRIES GROUP

GLASGOW WORKS:
GLENPARK ROAD, E.1. Tel.: Bridgeton 3841 (5 lines).
Grams.: "ALLMETALS, GLASGOW."

BIRMINGHAM WORKS:
FREETH ST., OLDBURY. Tel: Broadwell 1325 (5 lines).
Grams.: "ALLMETALS, OLDBURY."

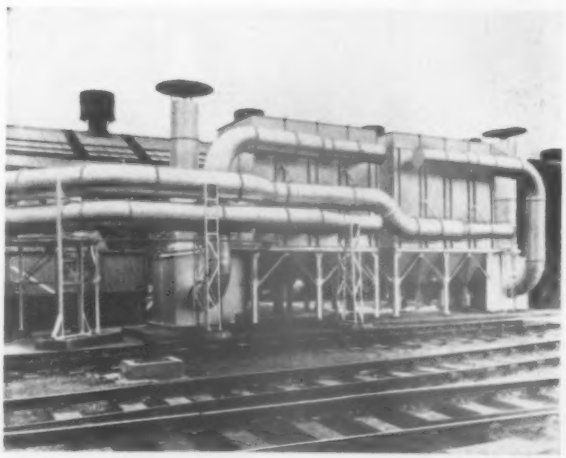
LONDON:
GAS WORKS ROAD, ST. LEONARDS ST.,
BROMLEY-BY-BOW, E.3. *Phone*: EAS: 5411

ALSO AT NEWCASTLE-ON-TYNE

we can control
electric arc furnace fumes

HOOD OR
DIRECT EXTRACTION PLANTS

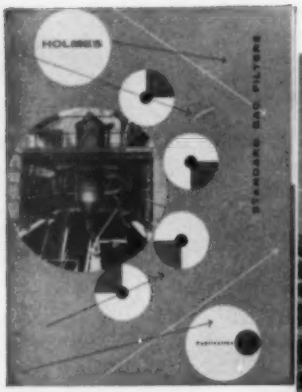
Tilghman High-Temperature Dust Collectors are now operating on ten British plants ensuring no visible discharge to the atmosphere even during oxygen refining periods.

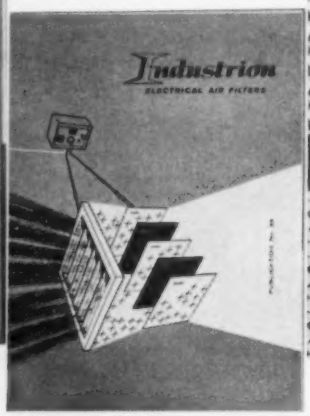


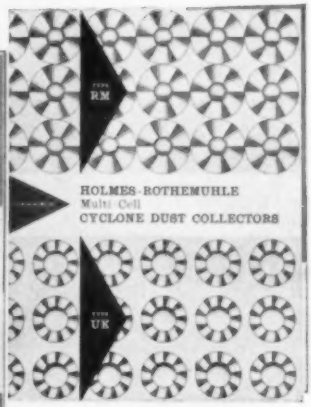
TILGHMAN'S
LIMITED
BROADHEATH, ALTRINCHAM, CHESHIRE
Telephone : Altrincham 4242 (9 lines)

STAVELEY GROUP

TAYSON T513



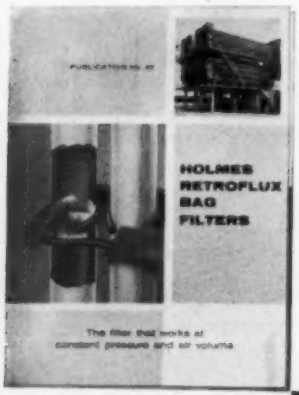




Which?

Which type of dust collection and control plant is most suitable, both technically and economically, for your particular application? A complete answer to this question lies within the pages of the various brochures illustrated. Have these brochures before you when you decide.

Ask for technical literature GCD/23



W. C. HOLMES & CO. LTD.

A Member of the B.H.D. Engineers Limited Group of Companies.

Gas Cleaning Division
Turnbridge, Huddersfield

Tel: Huddersfield 5280 London: Victoria 9971
Birmingham: Midland 6830

C101-1

FOCUS ON 'FULBOND'

Nº5

Permeability

This property is of prime importance to all foundrymen especially those using a naturally bonded moulding sand. In synthetic sands Fulbond gives all the permeability that can be desired.

The initial permeability of natural sands is usually adequate for the first few moulds but soon begins to show a serious decline, resulting in a series of casting defects. Addition of new sand to increase permeability does not always have the desired effect, since after each casting cycle there is a progressive build-up of inert fines from the various decomposed minerals. It therefore becomes increasingly difficult to raise the permeability of a moulding sand even with large quantities of new natural sand.

Because so little Fulbond is required to regenerate moulding sand, the clay content can be kept at a minimum thus giving maximum permeability.

Moisture content has great influence on permeability. Natural sands require much more water than synthetic sands because of their relatively higher content of clay and fines. If the moisture can be kept down, permeability is automatically raised. Fulbond is most efficient at low to medium moisture, so it is clear how useful it is in controlling permeability.

For a copy of this Brochure please write to:

THE FULLERS' EARTH UNION LIMITED

Patteson Court, Nutfield Road, Redhill, Surrey

A member of The Laporte Group

CHF 46

IT'S ALL AUTOMATIC . . .

ENGLISH STEEL CASTINGS CORPORATION LTD.

GRIMESTHORPE WORKS
SHEFFIELD 9

We have been privileged to design and supply a 60 ton per hour Sand Conditioning and Distribution Plant to this famous Steel Foundry.

Plant incorporates 2 large Batch Sand Mills with the latest automatic weighing equipment for sand and additions (Bentonite delivered by tubular flight conveyor).

We can now offer what we believe to be the most advanced batch weighing system in the country — for easy mix, easy output, select your weighments — set a dial and press a button — it's all automatic!

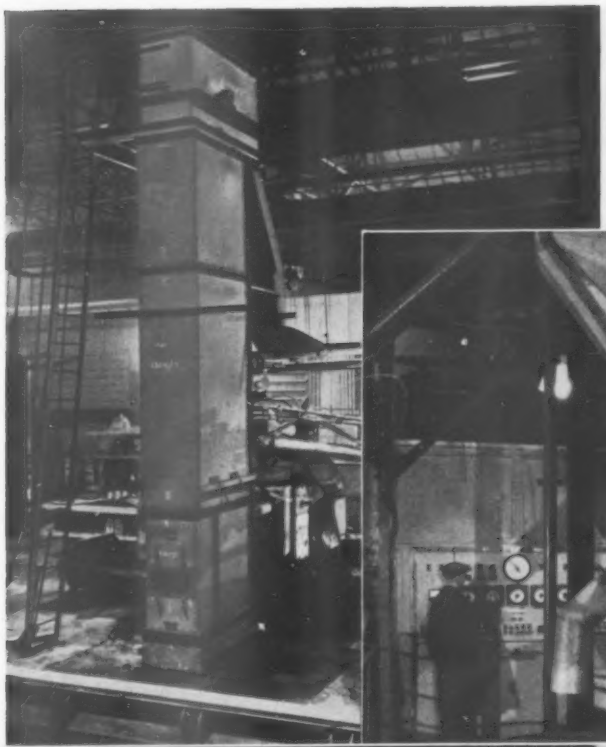
All Photographs reproduced by courtesy of English Steel Castings Corporation Ltd.

FOUNDRY EQUIPMENT LIMITED

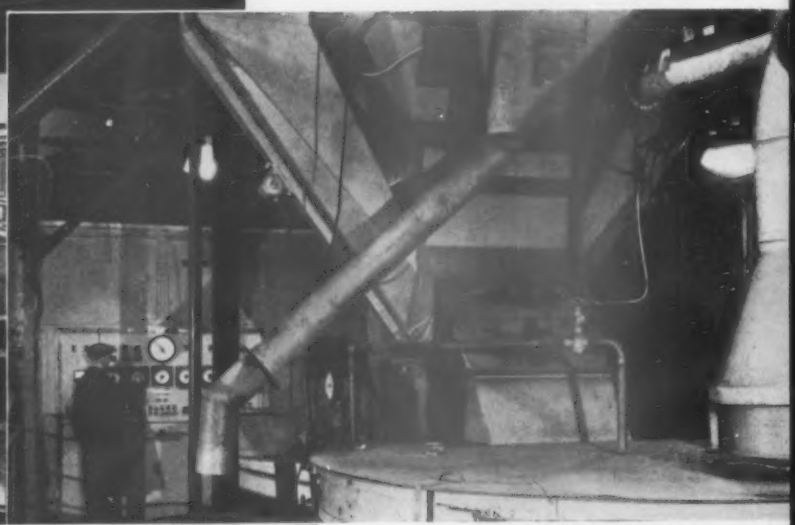
Leighton Buzzard, Bedfordshire, England

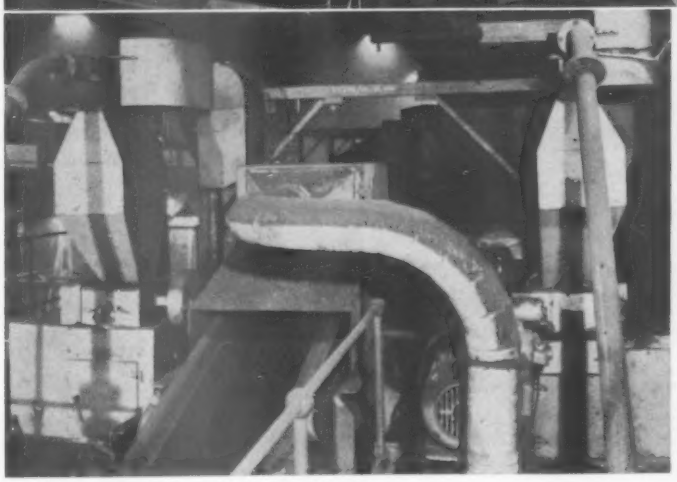
Telephone: Leighton Buzzard 2441 (5 lines) Telegrams: 'Equipment,' Leighton Buzzard, England

WEIGHING, BATCH FEEDING, MILLING, DISCHARGE, RESET



High precision weigh control for accuracy of mix, consistent sand quality and highest quality castings.





* *'English Steel' buy the best, how about you?*

OVERSEAS COMPANIES:

AUSTRALIA: Foundry Equipment (Australia) Pty. Ltd., Elizabeth, S. Australia.
CANADA: F. E. (North America) Ltd., Toronto.
SOUTH AFRICA: F. E. (South Africa) (Pty) Ltd., Johannesburg.
SPAIN: "Foundry Equipment" Comercial Espanola, S.A., Madrid.
U.S.A.: FECO Inc. Port Washington, N.Y.

AGENTS IN ALL INDUSTRIAL COUNTRIES

FE
FOR FOUNDRY EFFICIENCY
TRADE MARK

Investigate these NEW

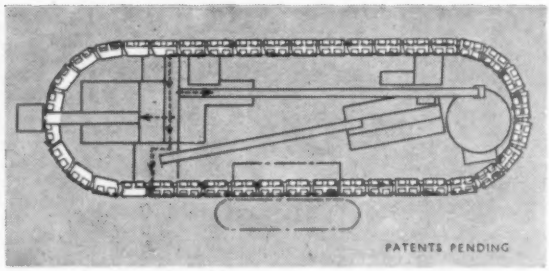
BARTLETT B-SNOW
CLEVELAND 5, OHIO

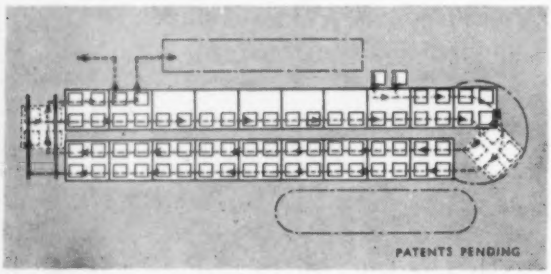
Mould Handling Systems

Unique and Practical

"Double MLC" Mould Handling System

Snap or tight flask moulds are set out in outside position on the car, poured, and travel almost completely around the loop. They are then transferred automatically to inside position on the car, and continue around the loop again for automatic removal at the shakeout. These new systems provide almost twice the cooling time of a conventional mould conveyor carrying only a single line of moulds; effecting substantial savings in floor space, equipment, building, and other facilities.



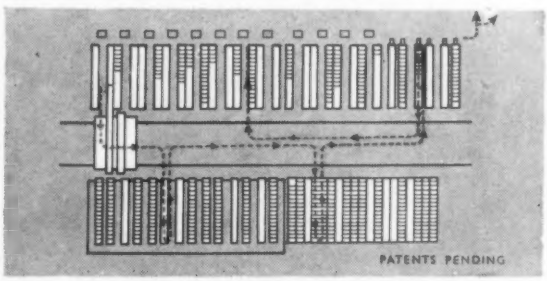


"Double MRI" Mould Handling System

Rectangular loop, consisting of two straight runs connected with a rotary turn and transfer car. Cars advance one car length, then remain stationary for timed period so large moulds can be loaded onto the conveyor, poured, and the moulds removed, while the conveyor is stationary. Moulds are carried side by side on the cars and make almost two complete trips around the loop, thus nearly doubling the cooling time per square foot of floor space.

"MF" Mould Handling System

Unlimited flexibility for jobbing foundries. The transfer car delivers pallets loaded with similar moulds, to the pouring, cooling, and shakeout zones, and returns the pallet with the bottom boards and bands—or flasks—to the moulding area. Handling similar moulds together permits moulds for different castings to be kept separate, and even poured with different metals, without interfering with other groups of castings. Slow jobs do not hold up the fast jobs. Moulding, pouring, cooling and shakeout are centralized, minimizing the equipment requirement.



Write today for a copy of Bulletin No. 135. It gives full details about eight different types of Bartlett-Snow Mould Handling Systems.

MANUFACTURED UNDER LICENCE BY

ACME CONVEYORS LTD

ACME CHAMBERS, BRADFORD STREET, WALSALL

GLASGOW AND HILLINGTON

GLASGOW SOUTH 2875 · WALLSALL 27444-5

MILLIONS

OF CAST ROTOR VANES FURNISH

POWER

FOR THOUSANDS OF AMERICAN

GAS TURBINES

NOW YOU CAN SERVE INDUSTRY BY PROVING THE MERIT OF

CAST SUPERALLOYS

IN ROTATING MEMBERS

In America, the gas turbine could not have reached its current state of development without cast rotor vanes. English designers, too, should be specifying castings—YOUR castings. We'll supply the technical data and, we hope, the alloys.

WAIMET ALLOYS CO.

5320 OAKMAN BLVD. · DEARBORN 2, MICHIGAN · U.S.A.

STAINLESS STEELS · TOOL STEELS · SUPERALLOYS · VACUUM-MELTED ALLOYS

A4

Space Restrictions?

Because of its compact dimensions and extreme manoeuvreability the LH-1 Hydraulic Loader brings efficient bulk materials handling into the most congested factory bay. Overall width of the machine is only 3' 11"—maximum working headroom 9' 6"—turning circle 7' 6" radius. Alternative interchangeable buckets, including a special ore bucket, enable the LH-1 to speed the loading of all kinds of bulk materials in factories and ships' holds.

OVERCOME THEM WITH THE Muir-Hill LH-1 LOADER!

WRITE NOW FOR FULL DETAILS

Muir-Hill

BUILT BY BOYDELL

E. BOYDELL & CO LTD · UNIVERSAL WORKS · OLD TRAFFORD · MANCHESTER 16

Telephone: TRAFford Park 1641

★ These machines embody either the B.S.C.R.A. or the B.C.I.R.A. Patent Systems of Dust Control and comply with the new Government Regulation 1 of the Grinding of Metals (Misc. Indus.) Regulations, and Regulation 7, para. (6) of the Iron and Steel Foundries Regulations, 1953.

ROWLAND

HIGH SPEED "TWIN DRIVE"

FLOOR GRINDERS

★ Built in three sizes with wheels 30in. dia., 24in. dia. and 18in. dia. respectively. Also available in the Single Wheel Type in all sizes. Details on request.

★ **Separate driving motors provide independent drive and control to each wheel.**

★ **Patent Compulsory Speed Change Device maintains maximum surface speed.**

★ **Efficient, foolproof Safety Devices provide adequate protection.**

★ **Wheels are collet mounted, not on spindle end, facilitating wheel change and reducing wear of spindle and nut.**

★ **Totally enclosed motors avoid electrical breakdown.**

★ **Short oversize spindles give maximum rigidity.**

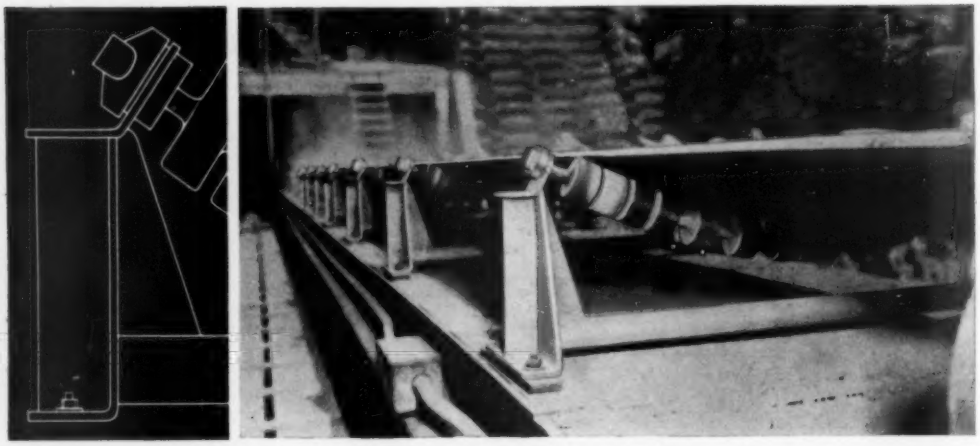
★ **Precision pre-loaded A.C. and roller bearings, allied with sturdy all-steel construction give longest life and smoothest running, and maximum wheel performance.**

F. E. ROWLAND & CO. LTD

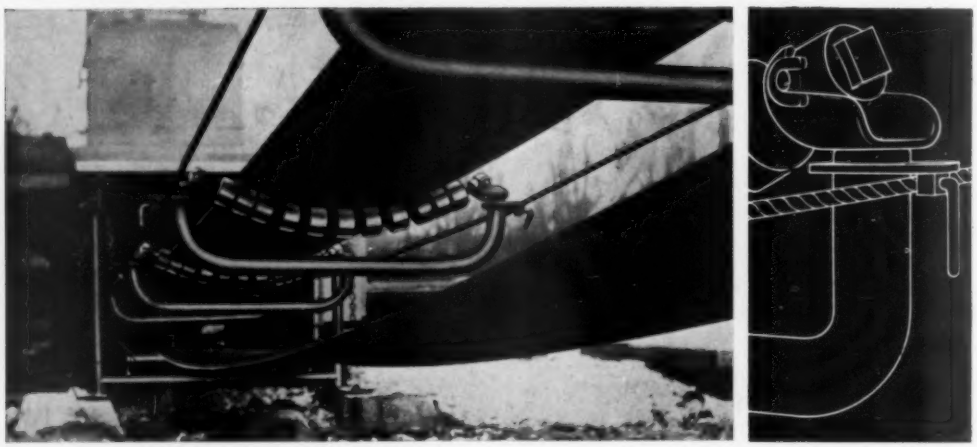
REDDISH · STOCKPORT · ENGLAND

Tel : HEATON MOOR 3201-2-3
Telegrams: 'HEROIC' REDDISH

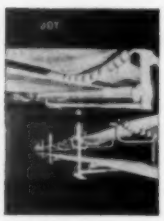
Export Agents : DRUMMOND ASQUITH (Sales) LTD., Halifax House, Strand, London, W.C.2. *Tel : TRAfalgar 722*



TWO SAVING WAYS WITH BELT CONVEYORS



JOY LIMBEROLLER IDLERS & LIMBEROPE CONVEYOR STRUCTURE



For the permanent structure—Joy Limberoller; a flexible conveyor idler that shapes itself to the load and can handle any bulk material transported by belt conveyors. It's saving? Because Joy Limberollers consist of hard wearing Neoprene discs moulded onto a flexible steel cable they exercise a self-cleaning action that saves belt and idler from damage, caused by material build-up under the belt. They cut spillage by giving a bump-free ride and need no maintenance.

Joy Limberope conveyor structures offer all the savings of the Joy-Limberoller plus easier and faster set-up, dismantling and relocating. They give a well-trained belt, are low in first cost... maintenance cost, and are easily transported from site to site. Savings indeed for any thrifty belt conveyor user!

JOY · SULLIVAN LTD

Bulletin CO/361 with full details will be sent on application to:- **Joy-Sullivan Limited 7 Harley Street, London W.1.** or any of the following Distributors :—

NORTHERN:
Hill Porter (Newcastle) Ltd.
14 Claremont Place,
Newcastle Upon Tyne, 2

NORTH WESTERN:
Atlantic Rubber Ltd.
Atlantic Street,
Broadheath,
Altrincham, Cheshire

SCOTTISH:
Potter Cowan & Co. Ltd.
54 French Street,
Glasgow, S.E.

MIDLAND:
The Central Manufacturing & Trading Co. (Dudley) Ltd.
Halesowen Road,
Old Hill, Staffs.

NORTH EASTERN:
Glover & Wood of Leeds
Victoria Works,
Leeds, 11

SOUTH EASTERN:
Southern Industrial Rubber Ltd. 1 High Street,
South Norwood,
London, S.E.25

NORTHERN IRELAND:
G. V. Baird, & Co.
324 Stranmillis Road,
Belfast, 9

SOUTH WESTERN:
Jackson Engineering Services (Bristol) Ltd.,
Woodside, Tickenham,
Clevedon, Somerset

EIRE:
H. R. Holfeld Ltd.
2/4 Melville Road,
Stillorgan, Dublin

Core and synthetic moulding sands
BIS
CO_2 Sands
Feslente resin-coated Sands
Technical data sheets sent on request
BIS BRITISH INDUSTRIAL SAND LTD
HOLMETHORPE · REDHILL · SURREY
Telephone: REDHILL 1122

NO. 10 PREPARED BLACKING

PHŒNIX

BLACKING or PLUMBAGO MIXTURE for the CO_2 process

STEELMOL *for STEEL and SPECIAL IRON CASTINGS*

SYNTHETIC GRAPHITE

HIGH CARBON BLACKING · TERRA FLAKE · COAL DUST
PLUMBAGO
AND "ALUMISH" FOR ALUMINIUM
Non-Silica PARTING POWDER

JAMES DURRANS & SONS LTD

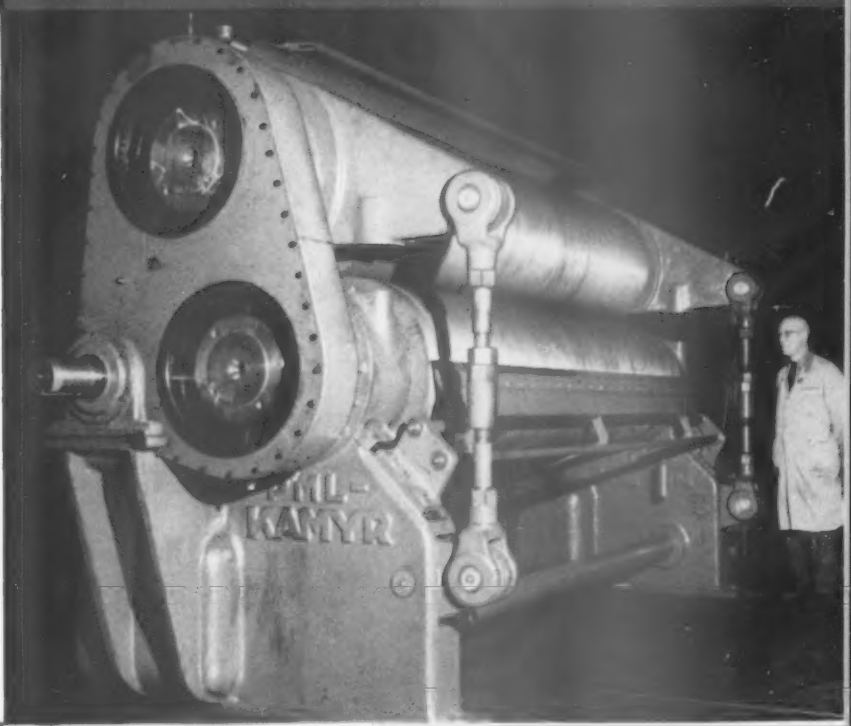
PHŒNIX WORKS & PLUMPTON MILLS PENISTONE near SHEFFIELD
Telephone : PENISTONE 3121 and 3122 *Telegrams* : BLACKING, PENISTONE

They are proved in practice . . .

that is why foundrymen everywhere use

Foseco*

products



A paper pulp mill weighing—with its cast iron rolls—45 tons made for Kamyr by Canada Iron Foundries Limited at Three Rivers, Quebec, using Foseco products supplied by Foundry Services (Canada) Limited.

FOSECO INTERNATIONAL LIMITED

Long Acre, Nechells, Birmingham 7, England.

Telephone: EASt 1911 (10 lines)
Telegrams: KUPRIT
Telex Birmingham

Foseco products have been proved in long practice . . . they give the foundryman higher rates of productivity, and better quality at lower cost. There is a *specialised* Foseco product for almost every metal melting application—for instance . . .

BRIX *for overall improvement in cupola melting conditions.*

* ***FEEDEX*** *a mouldable exothermic compound.*

IRON TERRAPOWDER *high-grade dressings giving a high-grade finish.*

* ***FERRUX*** *a hot topping compound for heating and insulating surfaces of feeding heads.*

MOLDCOTE *mould and core dressings of the self-drying or "flared" or "fired" types.*

Foseco*

WORLD WIDE SERVICE FOR FOUNDRYMEN

* *Registered Trade Marks*

CLEANAIR WET DUST SEPARATOR

Designed and manufactured for collecting fine particle dust

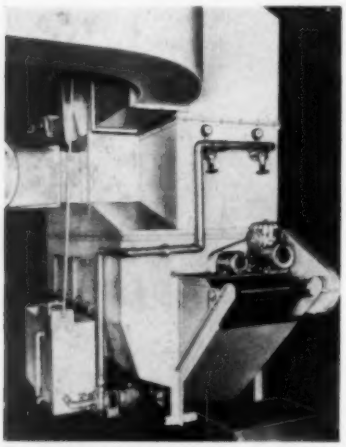
A unique and highly efficient Wet Separator has been developed by Cleanair Ltd. It has the following advantages:-

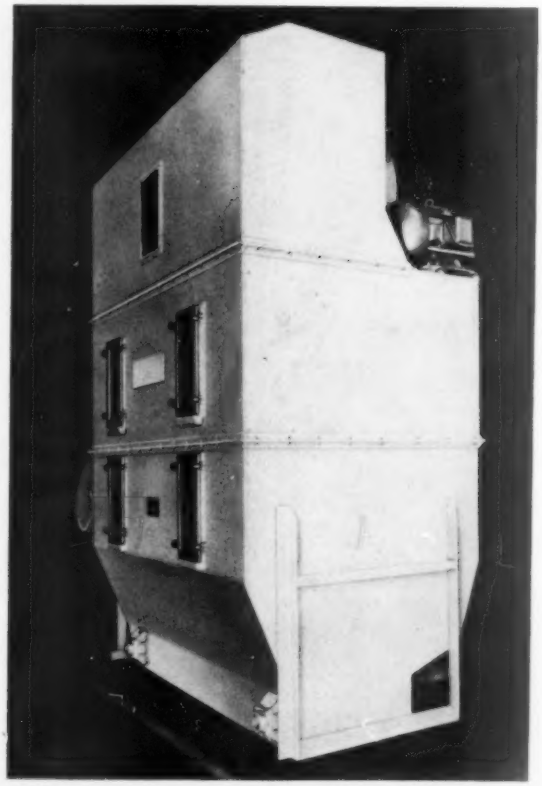
1 HIGH EFFICIENCY

2 LOW STATIC PRESSURE

3 MECHANICAL SLUDGE EJECTION

4 MINIMUM MAINTENANCE





Our Engineers will be pleased to discuss the economic and operational advantages of this new Separator. Please write for details.

Photographs by courtesy of Foundry Equipment Ltd.

CLEANAIR LTD

CLEANAIR

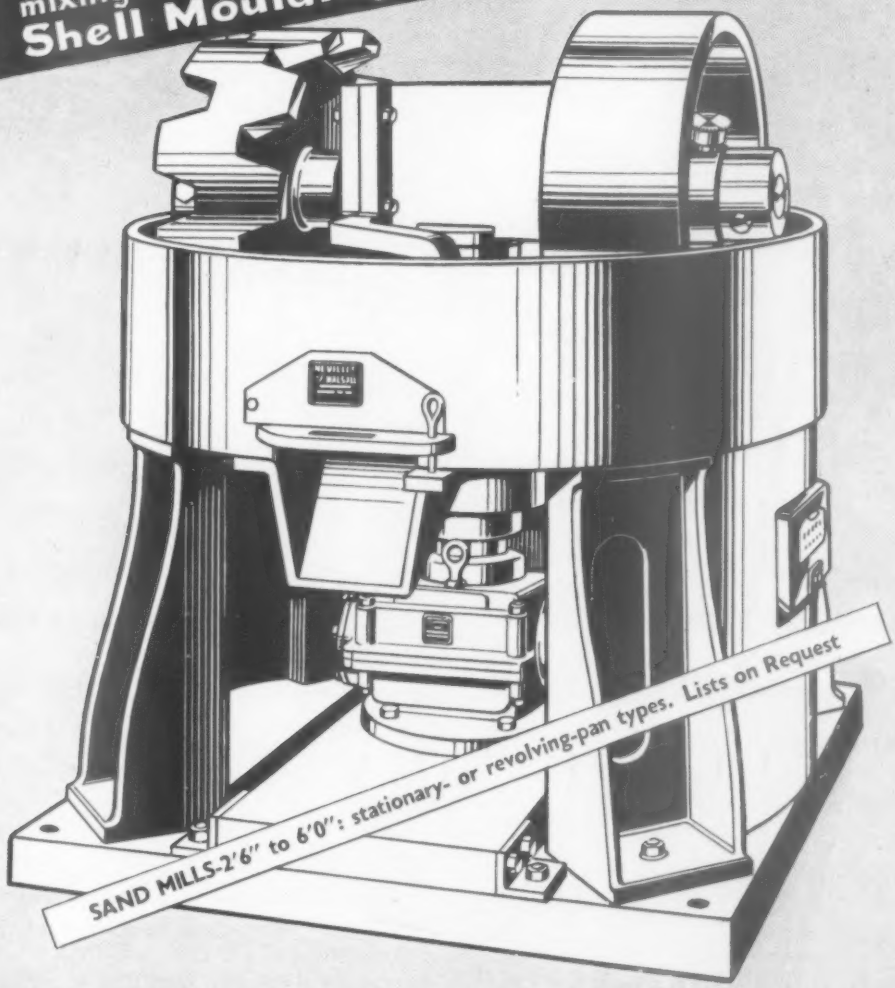
LIMITED

VENTILATING, DUST & FUME EXTRACTION ENGINEERS

LINSLADE, LEIGHTON BUZZARD, BEDFORDSHIRE

Telegrams: CLEANAIR LEIGHTON BUZZARD Telephone: LEIGHTON BUZZARD 2441-2

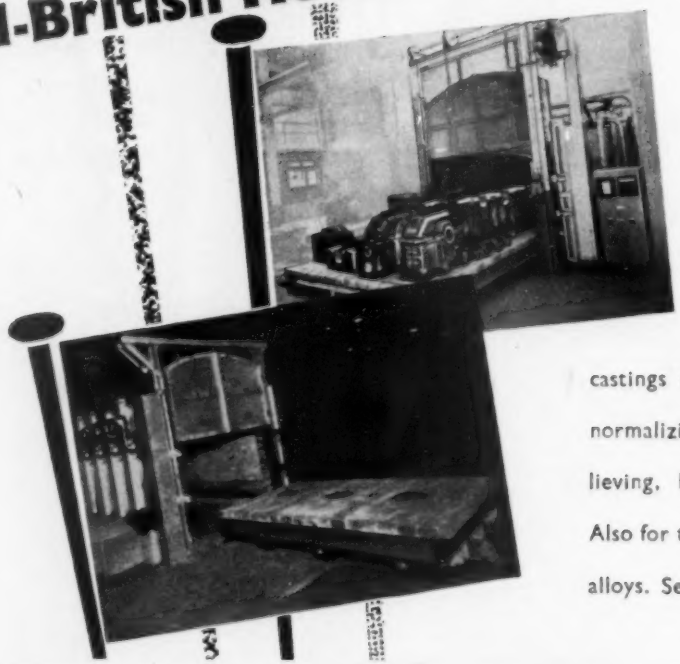
the approved method of mixing coated sand for
Shell Moulding



Nevilles of WALSALL

T.C.NEVILLE & SONS LTD HATHERTON STREET FOUNDRY, WALSALL.

All-British Heat Treatment Furnaces



'NEWSTAD' heat treatment furnaces are ahead in design and performance. Suitable for S. G. Irons, and for the treatment of steel castings and forgings. Furnaces for normalizing, anneaing, stress relieving, hardening and tempering. Also for the heat treatment of light alloys. Send for further information.

MODERN FURNACES and STOVES LIMITED

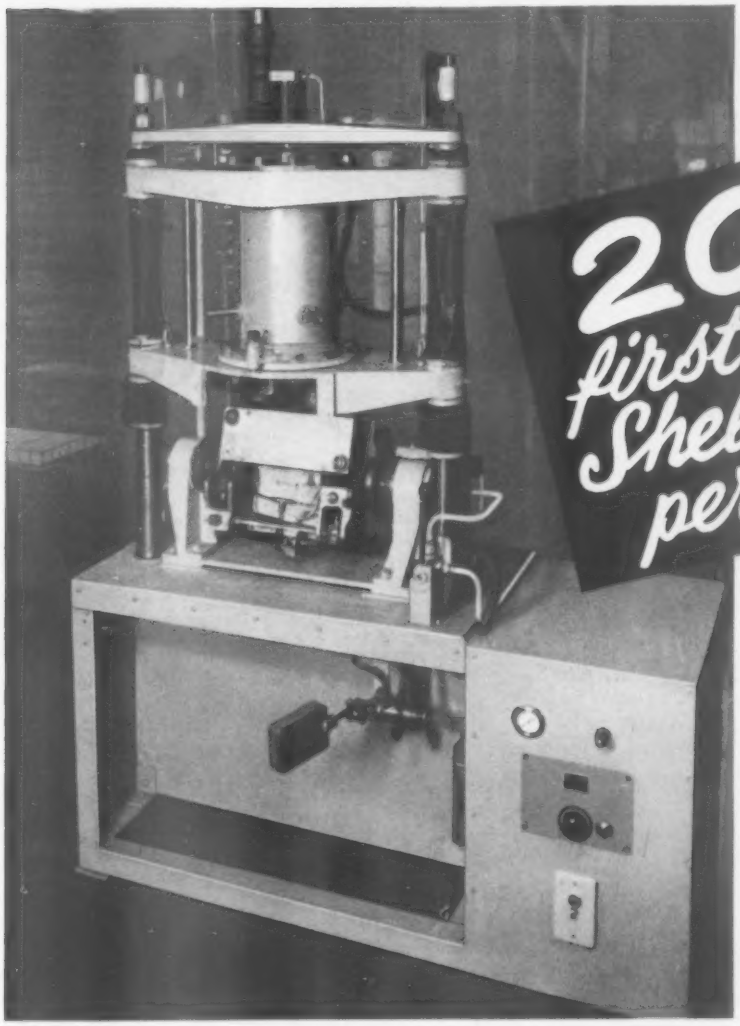
Builders of INDUSTRIAL FURNACES

BOOTH STREET, BIRMINGHAM 21. phone: SMEthwick 1591-2 grams: Mofustolim, B'ham 21

OVERSEAS AGENTS

Drew Brown Limited, 5410 Ferrier Street, Montreal, 9. Canada.
Fenter (Africa) (Pty), Ltd., P. O. Box 6738, Johannesburg South Africa.

8 219



200 first class Shell Cores per hour

With the

ANSON 200

SHELL COREMAKING MACHINE

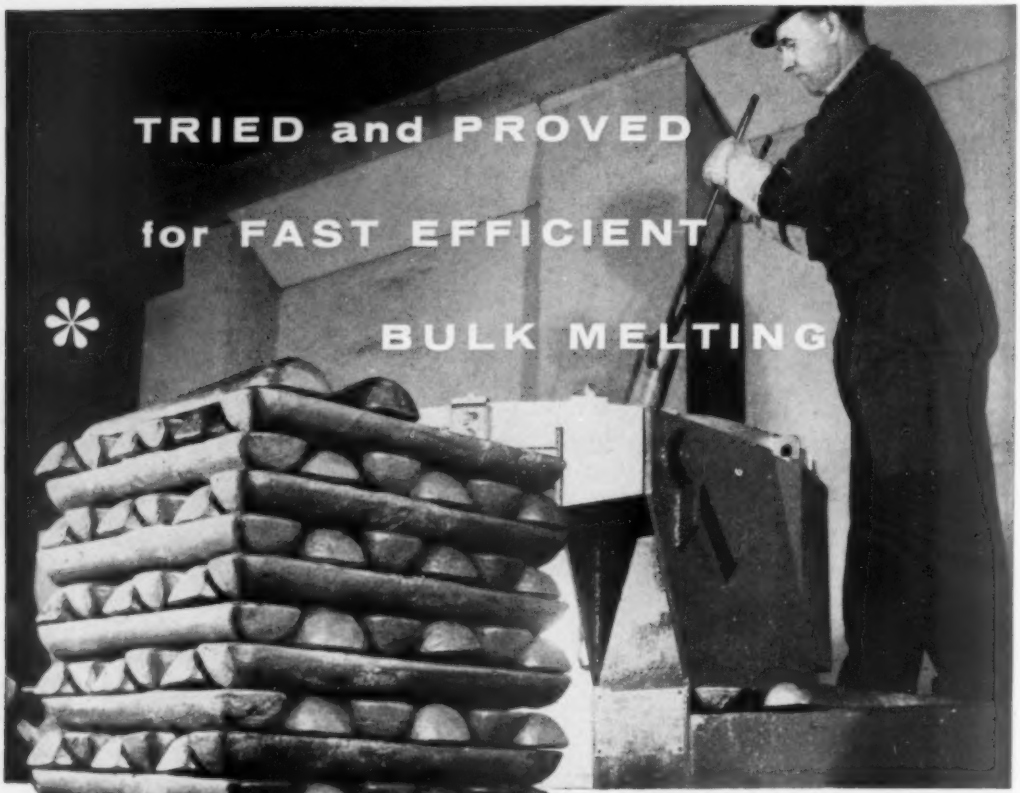
TWO COREBOX PRINCIPLE
MEANS VERSATILITY
100 CORES OF ONE KIND
100 CORES OF ANOTHER
ALL OF MAXIMUM SIZE
ALSO MULTIPLE CORES

Ask also for details of the
ANSON 40 SHELL MOULDING MACHINE
and the ANSON SHELL CLOSING PRESS

FOUNDRY SUPPLIERS LIMITED

25A COCKSPUR ST., LONDON, S.W.1.

Phone: TRAfalgar 1141



MORGAN

BASIN TILTERS

*The new BT-1300 takes only 60 minutes to melt all this Aluminium Alloy

During the past eighteen months 54 Morgan Basin Tilters have been installed in modern foundries for fast and economical bulk melting of a wide range of high quality aluminium or copper based alloys.

For top quality castings and lowest melting loss, invest in the most flexible of all bulk melters. Ask for a demonstration, with your own metal if preferred, at the Battersea Test Foundry.

MORGANITE CRUCIBLE LIMITED, NORTON WORKS, WOODBURY LANE, WORCESTER. Tel: Worcester 26691 Telex: 33191

A Member of The Morgan Crucible Group.

F54A

Refined
Cold Blast

PIG IRON

REFINED PIG IRON
FOR HIGH DUTY CASTINGS

CHILLED IRONS
FOR CHILLED CASTINGS

REFINED HEMATITES
FOR MALLEABLE CASTINGS

In 15 ton casts direct from receiver to required analysis

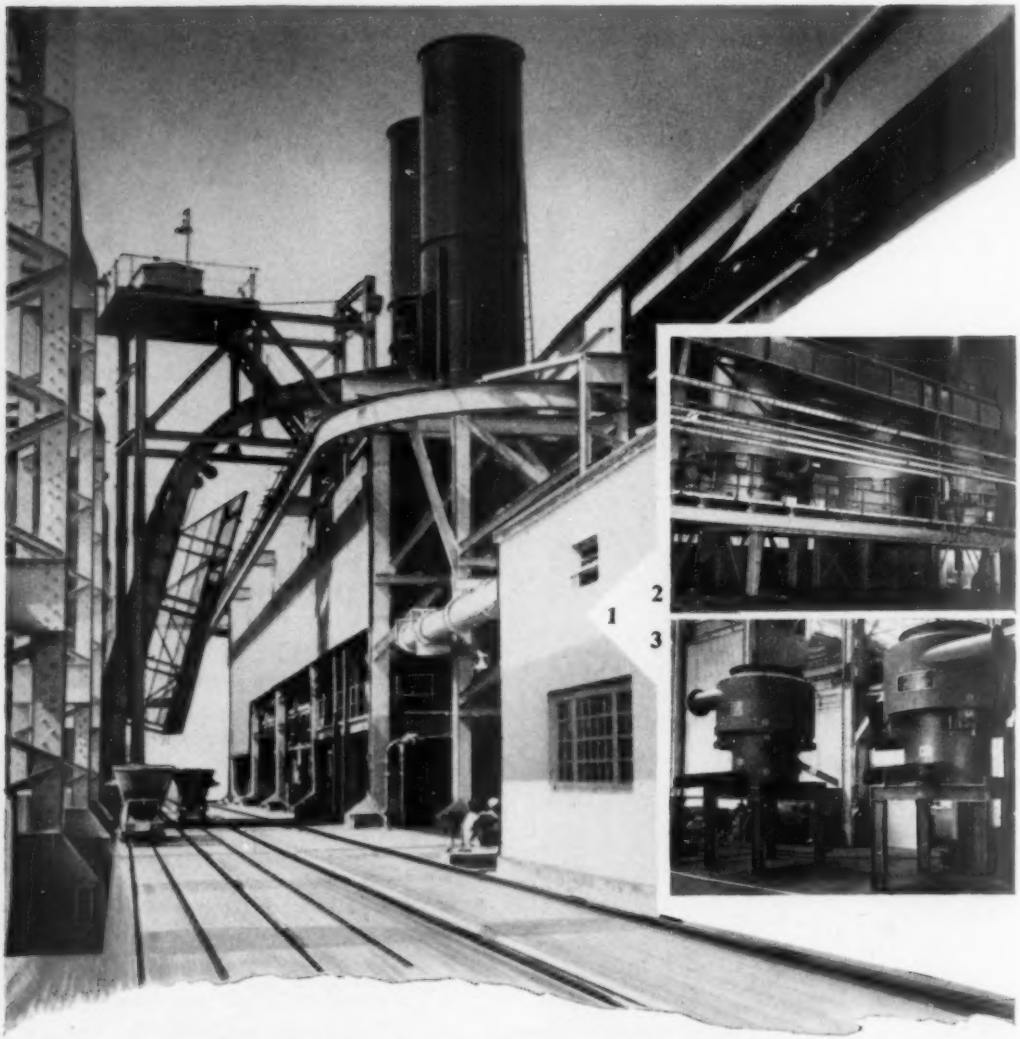
Castings made from these irons have greater density and toughness. You will have fewer rejections, greater freedom from cracks, breaks and other defects.

SPECIAL NICKEL & CHROME ALLOYS

Hand Samples on Request

WEST MIDLAND REFINING CO. LTD.

MILLFIELDS ROAD · BILSTON Tel 41069



All in the day's work

There is no cupola too large or too small for Incandescent Foundry Plant Division. From the cupolette with an output of 15 cwt an hour to the largest cupolas in Europe (35 tons an hour) there is an Incandescent-Whiting cupola tailored to your needs.

Photographs:

(1) Two 20-ton-per-hour cupolas with swivel charger bridging a rail track. (Indian Iron & Steel Co. Ltd.)

(2) Three 35-ton-per-hour cupolas with automatic air weight control and wet dust arresters. (Guest Keen Iron & Steel Co. Ltd.)

(3) Bottom sections of two 4-ton-per-hour cupolas in the works.

INCANDESCENT FOUNDRY PLANT

THE INCANDESCENT HEAT CO. LTD.

SMETHWICK · ENGLAND

5/4c/61

EXPORTING IS FUN!

RT. HON. HAROLD MACMILLAN

BE THAT AS IT MAY—

BUT

A great deal of skill and industry is involved in producing the **RIGHT PRODUCTS** for this exacting market.
Our many satisfied overseas customers are enjoying the fruits of this skill—

ARE YOU?

Send for details of :—

PARTING POWDERS
CORE OILS · CORE COMPOUNDS · CO_2 PROCESS BINDERS
DRESSINGS · FLUXES
EXOTHERMIC POWDERS
CEREAL BINDERS · COLD SETTING CORE OILS

HARMARK
FOUNDRY SUPPLIES

Manufactured by

HARBOROUGH CONSTRUCTION CO·LTD·MARKET HARBOROUGH

RAM IT WITH BROOMWADE

Type BR3—weight 7½ lb. length 23 ins.—Blows per minute 1,050—stroke 3 ins.

Type BR5—weight 17 lb. —length 24 ins.—Blows per minute 700 —stroke 5 ins.

Type SR5—weight 19½ lb.—length 42 ins. —Blows per minute 700—stroke 5 ins.

◀ Type BR5 in operation.

"BROOMWADE" Pneumatic Rammers are designed for economy and speed. They are particularly smooth and consistent in operation, and this is insured by their simple construction, correctness of balance and the lasting efficiency of the plate valve. For Foundry work where there is a danger of damaging the patterns with a steel butt, special rubber butts and peins can be supplied.

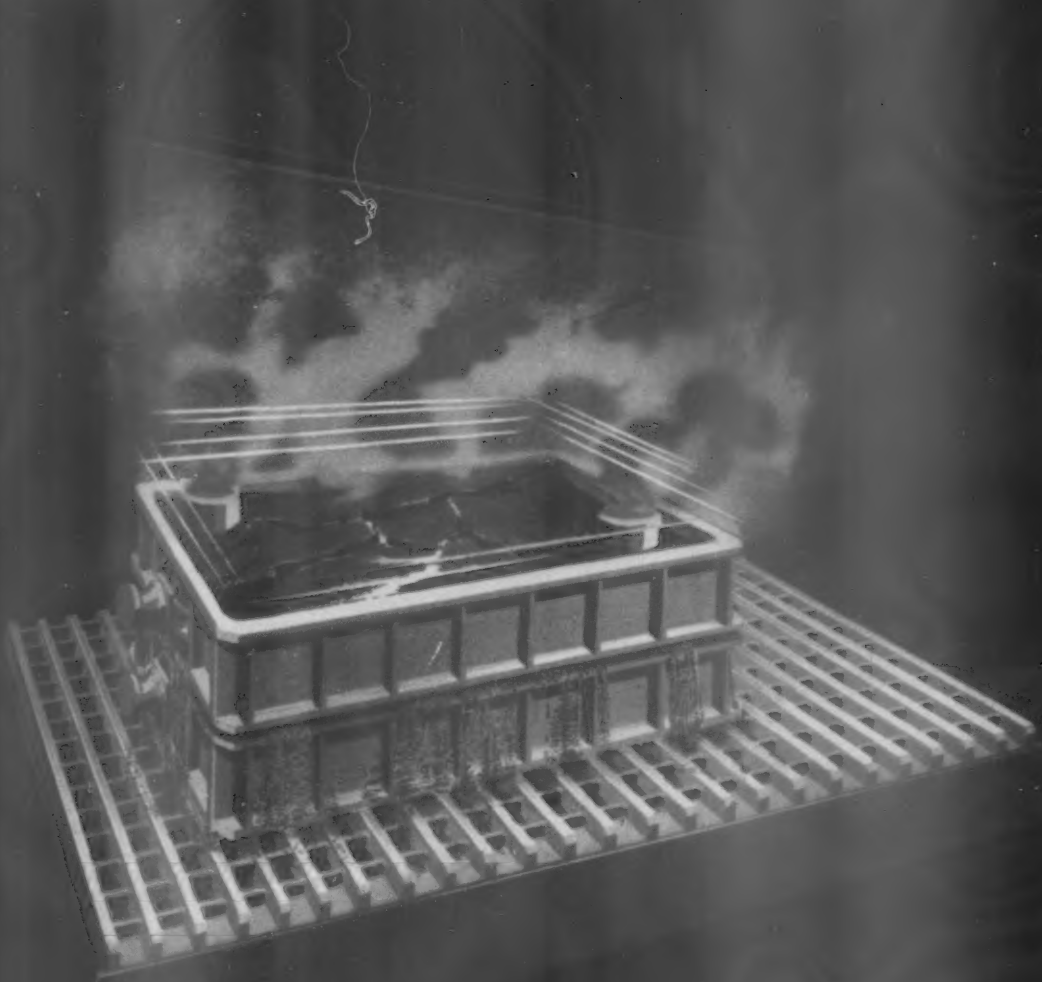
Write to-day for Publication No. 402 *T.E. for full details*, and if you would like a demonstration we will gladly make the necessary arrangements.

"BROOMWADE"

Air Compressors and Pneumatic Tools · YOUR BEST INVESTMENT

Broom & Wade Ltd., P.O. Box No. 7, High Wycombe, Bucks. Telephone : High Wycombe 1630 (10 lines) Telex 83-127

888 SAS



Sterling

MOULDING BOXES & SHAKE-OUT MACHINES

In use in more than 9000 foundries throughout the world

STERLING FOUNDRY SPECIALTIES LIMITED, BEDFORD, ENGLAND

P.T.O.

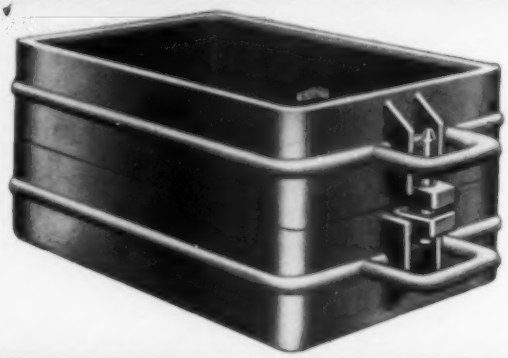
615/617 Cogsm

Sterling

MOULDING BOXES

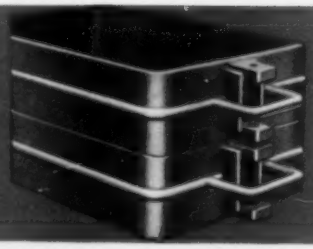
made from the world-famous *Sterling* Light Section

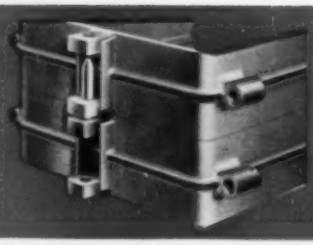
STYLE SA. The illustration on right, shows a typical box made from our special hot rolled section with solid flanges and solid centre reinforcing rib. This section contains a higher percentage of carbon than ordinary mild steel and is therefore more rigid.



STERLING FOUNDRY SPECIALTIES LIMITED BEDFORD, ENGLAND

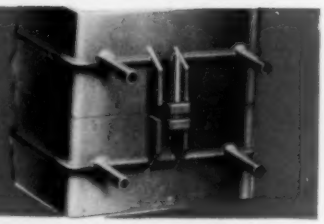
STYLE DA. This style has double lugs which can be arranged for either fixed or loose pin closing.

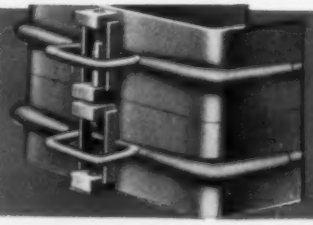




STYLE DR. This style is provided with sockets with a ⅞ in. diameter hole suitable for ⅞in. or 22 mm. loose handles.

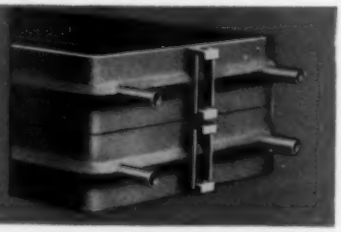
STYLE SP. This style has two straight handles each end and has single lugs. Quote Style 'DP' if double lugs are required.

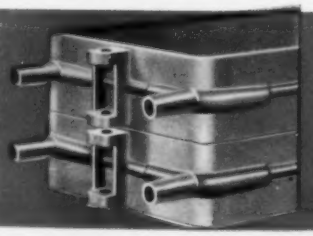




STYLE DGA. Similar to DA, but with reinforcement on the corners. These are light steel pressings, greatly increasing strength without adding much weight.

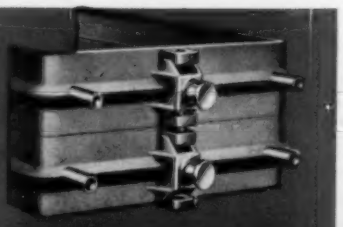
STYLE DL. Where larger boxes are required and yet lightness is an essential quality, our light section can be suitably reinforced. Angle reinforcement is shown here.



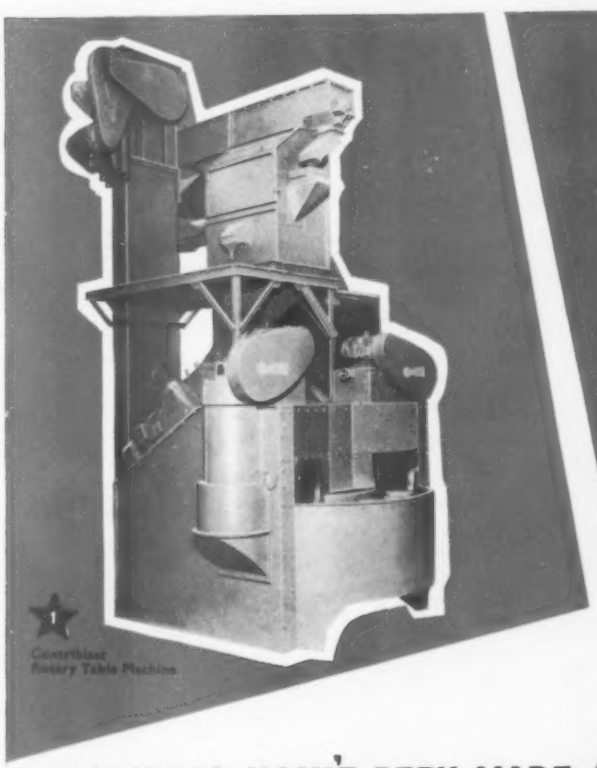


STYLE DGX. Four straight handles per part combined with reinforcement on the corners.

STYLE DLT. As style 'DL', but with trunnions. It also contains copper to give it anti-corrosion properties. This section combines lightness with strength, durability and rigidity.



STYLE H3. For sand pouring the lugs are placed on the longsides. H3 has two lugs on one side and one on the other. H4 has two lugs on each side. H2 has one lug each side set diagonally. Pouring holes can have collars if required.



1 Centriblast Rotary Table Machine

2 Centriblast Barrel Machine

THE CASTING HASN'T BEEN MADE

that cannot be cleaned by . . . . . .

3 Centriblast 18ft. square Airless Room Plant

Big castings, small castings, intricate or simple—they all come clean in a Centriblast. Illustrated here are just three of a fully comprehensive range of machines.—

1 for flat delicate castings

2 ideal for more robust castings

3 'you name it'

Call in Spencer & Halstead and end your cleaning problems—remember Centriblast cleans fast!

SPENCER & HALSTEAD LTD Blast Cleaning Division Ossett Yorkshire

Pawney 5.47

HEPBURN • Pangborn

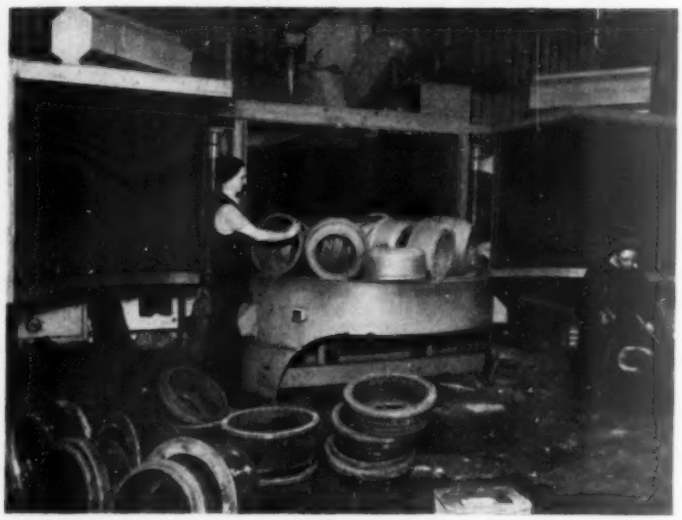
Solve the Problem

This company produces a diversity of castings in alloy iron and hematite iron. These include ingot moulds for the steel industry, brake drums and liners for Public Passenger vehicles, machine tool castings, gear wheel blanks, Colliery castings and General Engineering castings. The problem here was to find a suitable Shot Blast Machine to clean castings from one pound to two tons at lowest total cost and to speed production.

for **ALLOY STEEL & IRON CO · CHESTERFIELD & SHEFFIELD**

THE SOLUTION . . .

After seeing the Pangborn LK 6ft. Rotablast at the 1958 Foundry Exhibition they decided to instal this machine to replace an Airless Rotary Barrel which was limited to size and weight of castings it was able to clean.



THE RESULTS . . .

1 Machine easily installed.
2 No Foundations required.
3 All Castings produced are now cleaned by machine.
4 50 per cent. increase in Output is now cleaned by same number of operatives.
5 No Breakages of Thin Castings.
6 Considerable saving of shot.
7 Fettling keeps pace with output.
8 Perfectly clean Castings to customers on time.

Blasting time three minutes

HEPBURN CONVEYOR Co. Ltd.

Telegrams: CONVEYORS
Tel. Nos. 3695/6 & 7
WAKEFIELD, Yorks.

STANTON AND STAVELEY low phosphorus foundry pig iron

This iron is machine cast and customers special requirements can be met within the limits of analysis shown.

It is particularly suitable for the Automobile Industry and for all High Quality Castings.

ANALYSIS		
	Total Carbon	3·4% min.
	Silicon	2·0—4·5% (in ranges of ·5%)
	Manganese	0·7—1·1%
	Sulphur	0·05% max.
	Phosphorus	0.25 % max.

TELEPHONE: ILKESTON 2121

A free and confidential metallurgical service is offered to customers in all aspects of foundry practice and technique.

STANTON AND STAVELEY SALES LIMITED NEAR NOTTINGHAM

DARTMOUTH AUTO CASTINGS LTD

150
produce ~~120~~ every hour
ON BQ AUTOMATIC MACHINES

Even at these speeds each mould must be perfect and ready to produce a casting with finish and dimensional accuracy up to the standards for which "DARCAST" have become famous.

- ✓All pneumatic, no electronics.
- ✓Press one button to make a mould.
- ✓Manual operation whenever required for "pilot" castings, etc.
- ✓Foolproof automatic controller can be varied to suit any required speed or sequence.
- ✓Shockless jolt, nothing below ground.

Write now for details of these outstandingly successful machines or visit our works for a demonstration.

BRITISH MOULDING MACHINE CO. LTD.

Telephone: FAVERSHAM 2246/7/8

One of the BQ Automatic Machines in the "DARCAST" Foundry at West Bromwich.

Empty box rolls in on gravity conveyor. Mould emerges on flanged rollers to clear "cods" or ram-up cores.

WESTON WORKS - FAVERSHAM - KENT

Telegrams: EASIRAM, FAVERSHAM

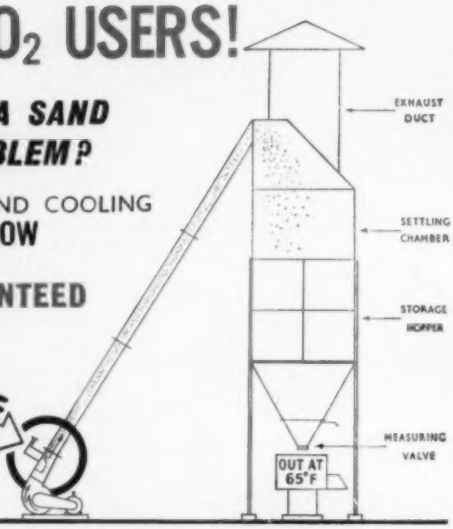
ATTENTION CO_2 USERS!

DO YOU HAVE A SAND COOLING PROBLEM?

THIS REVOLUTION IN SAND COOLING IS AVAILABLE **NOW**

PERFORMANCE GUARANTEED

THE SECRET IS HERE IN AT 330° F



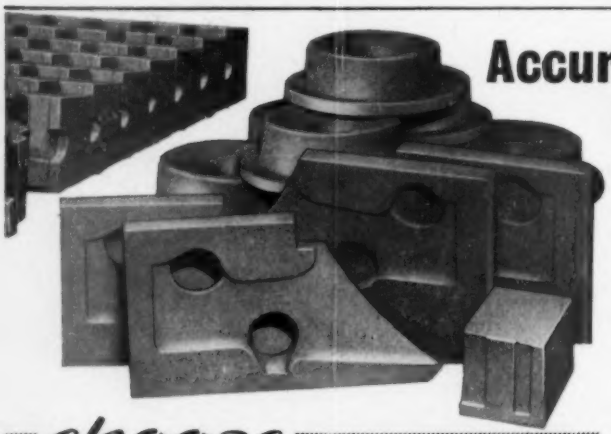
- THIS AMAZINGLY SIMPLE AND HIGHLY EFFICIENT PLANT NOT ONLY COOLS BUT IN DOING SO ELEVATES THE SAND AND DEPOSITS IT IN A HOPPER IMMEDIATELY ABOVE THE MIXER READY FOR USE
- THE FLOW IS CONTINUOUS AND UNIFORM IN QUANTITY AND TEMPERATURE
- RUNNING COSTS ARE LIMITED TO THAT OF A SMALL FAN MOTOR
- MAINTENANCE IS NEGLIGIBLE
- DUCT WEAR IS NEGLIGIBLE
- IN THE EVENT OF STOPPAGE—NO RUN BACK INTO FAN

PAT. APPLIED FOR

PARKER MITCHELL ENGINEERING Co., Ltd.

THORNLIEBANK INDUSTRIAL ESTATE, GLASGOW, SCOTLAND.

Telephone: GIFFNOCK 2238. Telegrams: PARMIT.



Accurate cores— better castings

Low additions of ALMARINE are sufficient to yield a sand mix that is free-flowing, takes an accurate impression, and provides strong cores with only short baking times. Whether large and small, cores can be made from the same unit mix which has a long bench life. Ask for literature.

choose **FLETCHER MILLER** *core oils*

FLETCHER MILLER LTD., HYDE, CHESHIRE

Telephone: HYDE 3471 (5 lines) Telegrams: EMULSION, HYDE

CO.10

SANDSLINGER SPARES SERVICE

USE this service to keep your Sandslinger operating at peak efficiency. Contact "SANDSLINGER SPARES" for prompt and courteous attention.

TELEX 77-137

FOUNDRY PLANT & MACHINERY LTD

EGLINTON WORKS, COOK STREET,

GLASGOW, C.5

Telegrams: "SANSLINGER" GLASGOW, C.5

Telephone: SOUTH 2283-5 GLASGOW

CUPOLA PATCHING and RAMMING MATERIAL...

. . . for the regular patching of Cupolas and Cupola brickwork, and for complete rammed linings up to 7" thick . . . and a full range of Refractory Monolithic Materials, Plastics and Cements. Stockists of Sairset, Super-Plastic, Kast-O-Lite, Atmoset, Quik-Pach, KS4, SK7, etc.

Immediate deliveries anywhere in Britain.

Dyson for *much* quicker service

J. & J. DYSON LIMITED

ATTERCLIFFE ROAD WORKS, SHEFFIELD Telephone: SHEFFIELD 20702

FOUNDRY TRADE JOURNAL

Vol. 111 September 28, 1961 No. 2338

Established 1902

Incorporating

IRON & STEEL TRADES JOURNAL

Published each Thursday

Annual subscription: *United Kingdom 52s.*
Abroad 60s. *Payable in advance*

Editorial Director:
V. C. FAULKNER, F.R.S.A., HON.M.I.B.F.

Editor:
A. R. PARKES, M.I.B.F.

Commercial Editor:
R. M. HOWSE

Production Manager:
R. J. LOVELL

Publisher:
H. J. DWYER

Circulation Manager:
E. T. GRIFFITHS

District Representatives:
G. P. ELLIOTT (Northern Area) 'phone: Altrincham 1334
T. H. SMITH (Scotland) 'phone: Dumbarton 1046
D. C. RYALL (Southern Area) 'phone: TRAfalgar 6171

The FOUNDRY TRADE JOURNAL is the official organ of the British Steel Founders' Association; Association of Bronze & Brass Founders; the Light Metal Founders Association; Foundry Trades' Equipment & Supplies Association; and the National Society of Master Patternmakers.

AN INDUSTRIAL NEWSPAPERS PUBLICATION

Published by

INDUSTRIAL NEWSPAPERS (FUEL & METALLURGICAL) LTD.

Directors:
F. BARRINGTON HOOPER, B.A.,
Managing
F. H. HARLEY
JOHN HOOPER
V. C. FAULKNER
E. G. WESTON, *Secretary*

JOHN ADAM HOUSE, 17-19, JOHN ADAM STREET, ADELPHI, LONDON, W.C.2

Telephone: Trafalgar 6171 (Private Branch Exchange)

Telegraphic Address: "Zacatecas, Rand, London."

PRINCIPAL CONTENTS

PAGE

Aspects of South African Foundry Technology

Abstracts of papers presented to the third annual conference of the South African branch of the Institute of British Foundrymen .. 377

In the Land of Forge and Forest

Account of the visit of the Newcomen Society to Sweden, which took place this summer 383

Holding Cores Down

By "Checker"

A practical method is described for the easy and accurate location of sprig holes in cores 387

Aspects de la technologie de la fonderie en Afrique du Sud.
Extraits de mémoires présentés à la troisième conférence annuelle de la section sud-africaine de l'Institute of British Foundrymen. 377

Au pays des forges et des forêts.
Compte-rendu de la visite en Suède faite par la "Newcomen Society" cet été. 383

Noyaux de retenue. Par "Checker."
On décrit une méthode pratique pour la location facile et exacte des trous pour pointes de mouleur dans les noyaux. 387

Gesichtspunkte der Südafrikanischen Giessereitechnik.
Auszüge aus Vorträgen, welche auf der dritten Jahrestagung des Zweiges Südafrika des Institute of British Foundrymen gehalten wurden. 377

Im Lande der Schmiedehämmer und der Wälder.
Bericht über die Schwedenreise der "New-comen-Society" im vergangenen Sommer. 383

Niederhaltekerne. Von "Checker."
Es wird eine praktische Methode beschrieben, welche zur einfachen und genauen Ortsbestimmung von Kernnagellöchern in Kernen dient. 387

Features, News, Commercial Information, and Statistics

Leader: Fruitful Co-operation 375
Dinner: Owen Organization 376
Correspondence: A Foundry Engineers' Group? and Antique Signs .. 376
German Foundrymen's Technical Association 382
Forthcoming Events 385
Personal 386
Sculptor uses New Foundry Technique 389
Industrial Films 390
Equipment and Supplies 391
Consolidating Export Relationships 393
Translation Services 394
American Letter 395
News in Brief 397
New Patents 398
Book Reviews and Publications Received 399
Raw Material Markets 402
Current Prices of Iron, Steel, and Non-ferrous Metals 404
Company News (advert. section) 43

AUGUST-SIMPSON
mix-mullers

Here are a few Special Features:

- Light weight, low inertia mullers with adjustable spring pressures.
- Large batch capacity in relation to pan diameter.
- In production sizes, muller crib has removable section through which all rotating machinery can be removed without interfering with overhead hoppers, structures, etc.
- Inside and outside plows adjustable vertically and radially by positive screw device.
- Centralised Lubrication.
- Production size mixing tests can be carried out in our works at Halifax.

Sole Licensees and Manufacturers for the British Empire (excluding Canada, Australia and New Zealand) of the Simpson Sand Mixer.

HALIFAX ENGLAND

August's LIMITED

TELEPHONE: HALIFAX 61245/6/7/8
TELEGRAMS: AUGUST, HALIFAX

FOUNDRY
TRADE JOURNAL
Vol. 111 September 28, 1961 No. 2338

Fruitful Co-operation

An outstanding feature of the last decade or so is the excellent co-operation which exists between the actual founders and the suppliers of their plant and materials. This was not always so, as when orders were placed, both sides often made elaborate efforts to cover themselves in case of dispute. The buyer often suspected that the plant was insufficiently developed and that the seller might be experimenting at the founders' expense. When neither side had much liquid money available if resort was made to the law it could be with disastrous effect to both parties. In boom periods, any such disputes were usually settled over a luncheon—and much more cheaply. Obviously, there were faults on both sides as, on occasion, a foundry would make one or more copies of a piece of successful plant. In one case, the drawings supplied with their tenders by a number of plant and equipment firms were utilized by a firm to instal a complete new foundry. On the other side, there were cases where equipment firms supplied plant quite unsuitable for withstanding the wear and tear of foundry usage.

To-day, these conditions have quite changed, for no longer are the suppliers of plant and equipment just small back-street shops, but concerns of real standing doing a world-wide business. They meet the large foundry directors on level terms, make a serious attempt to learn the requirements of new developments, and where a new type of plant is suggested, arrangements are made for joint exploitation until a satisfactory production is assured. The same spirit of co-operation is shown in the field of supplies. Where new products have been tested in the laboratories and plant of the suppliers, it is found easy to co-operate with foundry customers to have the material tried out under works conditions.

This all reacts to the general benefit of the industry and, as a result, the period over which new products pass from the experimental stage to efficient production to-day is remarkably short. The speed at which shell-moulding and the CO_2 process changed from being novelties into making worthwhile contributions to the art and science of producing castings warrants the appellation of phenomenal. Nowadays, the progressive foundry owner welcomes the opportunity of collaborating in the development of new materials, processes and plant. This new attitude has made, and will make, a serious contribution to the progress of the foundry industry. May it long continue.

Dinner

OWEN ORGANIZATION

A "family" party was the way in which Sir Alfred Owen described the informal function at which the Owen Organization entertained approximately 600 guests to dinner in Grosvenor House, London, on Wednesday of last week. The Organization now comprises no fewer than 60 companies with Rubery Owen & Company, Limited, as the starting point, two-thirds of the group being added since the last war. Firms in this quite impressive listing had invited customers, local government executives, representatives of industry and the Press, to this family gathering. Following the Loyal Toast at the conclusion of the meal, proposed by Mr. Ernest Owen (joint managing director), Sir Alfred (chairman and joint managing director of the Owen group) expressed a welcome to the guests and particularly mentioned amongst them, Viscount Mackintosh (chairman of the National Savings Movement) and also the world's land-speed record-holder, Mr. Donald Campbell. He was pleased to inform his audience that next spring in Australia, Mr. Campbell, who was now fully recovered from his recent accident, would have "another go" at raising the land speed with a rebuilt car. Closing his speech, he referred especially to the overseas companies representatives and embassy friends who were present. In a fleeting comment on the Common Market, he said he thought Britain must "go in" and face all the problems involved.

Sir Thomas M. Bland (who was associated with Sir Alfred in county council business) then proposed a vote of thanks on behalf of the guests, particularly paying tribute to Sir Alfred's many services to industry, Church and State. Sir Julian Pode (managing director, Steel Company of Wales, Limited) also supported this proposition which was carried with acclamation.

This completed the speeches and the rest of the evening was given over to informal conversations with old and new acquaintances, light entertainment being provided by a Sydney Lipton Octet and Shirley Abicair. A nice gesture at the commencement of the evening was the presentation of a red carnation buttonhole to each guest.

Correspondence

To the Editor of the FOUNDRY TRADE JOURNAL

A FOUNDRY ENGINEERS' GROUP?

SIR,—Referring to your recent correspondence "sparked off" by "Enthusiastic Engineer," I am certain there are many foundry engineers who would welcome the type of Engineers' Group that he suggests.

Like most branches of engineering, foundry engineering—as opposed to metallurgy and the science of castings manufacture—is coming more and more to the fore; a study of modern mechanized foundries soon proves this. It is also true that much "trial and error" effort is often put into planning for a particular firm when a knowledge of what was happening elsewhere would assist in obviating mistakes or at least in modifying ideas. Everyone can benefit from the mistakes as well as the success of others.

I have reason to know that there are many techniques within the foundry industry which are not generally known, even amongst the industry, and such a group as is suggested would greatly assist in assembling such information into a "Foundry Engineers' Manual," which would automatically prevent much wasted effort. The Manual could give such information as a listing of foundries and the plant equipment used therein, notes on up-to-date methods, machine ratings with regard to production, on new materials, and on research in progress (by year), etc. To be kept up to date by such a Manual would be of enormous assistance to an analysis engineer, such as myself, particularly where the Manual covered all known foundry practices. When economies are due for consideration, such a Manual would greatly assist in the evaluation of one method and/or machine against another—in fact, the whole field of ergonomics as applied to the foundry industry, would be well served.

The Engineers' Group would, no doubt, subscribe much to the task of foundry layout, design and building, as naturally layout is greatly affected by machine design and production capability. Particularly is this so when considering mechanized foundries. It is possibly looking a fair way ahead, but such a Group would be well informed when computer and full electronic foundry control becomes a reality, and when foundries follow the lead of the steel industry.

As with many old-time crafts, foundry production is rapidly being controlled by the methods engineer and following on his recommendations, by tool and machine designers. The foundry engineer, in addition to solving normal engineering problems as are present in any mass- or semi-mass-producing factory, can find much to fascinate him in the science of metallurgy and in liquid- and solid-state physics as they concern casting. There is immense scope for the mould designer when considering how he may combat or utilize the actions and reactions of metal under varying conditions. Yours, etc.,

N. TAYLOR.

64, Hookfield,
Tye Green, Harlow, Essex.

(Further correspondence on this subject, possibly directed towards practical implementation of the ideas put forward will be welcome.—EDITOR.)

To the Editor of FOUNDRY TRADE JOURNAL

ANTIQUE SIGNS WANTED

SIR,—Over the past years I have formed a collection of signs, made mostly in cast iron and these date from approximately 1830. Nearly all of them are of British origin, although some have come from abroad, mostly from Europe. The chief source of supply, up to now, has been by personal contact with scrap metal merchants throughout the country, or through railway companies, local authorities, etc.

My main interest is from the typographical point of view—some of the type-faces used over a hundred years ago, have now been revived, engraved on Perspex and referred to as "modern." If you or your readers are able in any way to assist me in my attempt to preserve any of these notices I should be most grateful. I quite expect to pay for any items that may be available, but would emphasise that I am not writing this letter with a view to any personal monetary gain.

Yours, etc.,
C. V. MARTIN.

8, Shepherds Way,
Rickmansworth,
Herts.

Latest Foundry Statistics

Copper-base Castings: The September *Bulletin* of the British Bureau of Non-Ferrous Metal Statistics states that during July production of copper-base castings was 6,811 tons. Output for the first seven months of this year at 49,849 tons is a little below that of the corresponding period for 1960, 50,211 tons.

Aspects of South African Foundry Technology

At the third annual conference of the South African branch of the Institute of British Foundrymen, held earlier this year, three papers were presented dealing with problems of general interest to the industry. Abstracts of these papers, two of which are concerned with cupolas and the third with the CO_2 Process are given below.

Cupola Practice in an Indian Foundry

*By A. V. Kulkarni**

Prior to 1954, the Author's foundry was an integral part of the workshops, manufacturing castings for internal use. Government policy aimed at encouraging the indigenous production of automobile parts resulted in the company deciding to convert the foundry for the manufacture of all types of machine tool and automobile castings. The castings produced range in weight from 4 oz. to 6 cwt.

Plant

The foundry is equipped with 36-in. diameter cupolas, an automatic cupola-charging machine, modern equipment for moulding, coremaking and sand conditioning, mould-drying ovens and a wheelabrator for cleaning the castings. There is a pattern shop and laboratory for testing sand and other materials. The foundry has at present a capacity of 250 tons of castings per month with scope for further expansion. Practically all components for P6, P3 and P4 types of Perkins Diesel Engines are being manufactured including chilled camshafts, tappets, and bearing caps. Production is mainly of two base metal grades, BSS 14 and 17. Other grades such as 12 and 15 are also produced by controlling the additions of inoculants.

Raw Materials

The quality of the metal at the cupola spout depends to a considerable extent on the different raw materials as very little refining is achieved inside the cupola. A check on the selection of raw materials is made on the following basis: (*a*) *Pig irons:* Two types of pig-iron, namely, charcoal pig-iron and coke pig-iron, are available in India. The charcoal pig-iron is preferred on account of its low sulphur and phosphorus contents. In its absence suitable mixtures of the different grades of coke pig-iron are used. The weight of each pig is generally 25 to 30 lb. (*b*) *Steel scrap:* An average analysis of the steel scrap used is as follow: Carbon 0.6 per cent., silicon 0.2 to 0.3 per cent., manganese 0.4 to 0.6 per cent. (*c*) *Cast-iron scrap:* Chemical analyses are carried out on cast-iron scrap purchased from outside to segregate it as per Table 1 analyses for incorporation into the charges for the respective grades. Only pieces of fairly-uniform size and weight not exceeding about 30 to 40 lb. are used for charging. The surfaces of the cast-iron scrap should be free from silica, and any coresand remaining inside the castings is removed before charging. (*d*) *Limestone:* The foundry buys good quality limestone with less than one per cent. silica as an impurity. (*e*) *Coke:* India has a similar problem to South Africa with poor quality coke. The average ash content of by-product coke varies generally from 17 to 25 per cent., that of the best coke being about 17 per cent. A typical analysis of the best variety of coke which is generally used in this foundry is: Ash 17 per cent. max., volatile matter 0.8 to 1.2 per cent., moisture 1.2 to 2.0 per cent., shatter value 92 to 95 per cent. The size of coke used is restricted to four to six inch. (*f*) *Ferro alloys:* Ferro-silicon of the 16 to 20 per cent. Si content is normally used in the cupola charges, the 60 to 70 per cent. Si grade being only used as a ladle alloy-addition. The 60 to 70 per cent. grade ferro-manganese is normally used. Ferro-chromium is usually added as a proprietary exothermic compound to the ladle. The available chromium of the addition is 50 to 55 per cent.

TABLE 1.—*Typical Analyses of Grade 17 and Grade 14 Castings.*

	Grade 17 per cent.	Grade 14 per cent.
Total carbon	3.0 to 3.2	3.4 to 3.6
Silicon	1.9 to 2.2	2.2 to 2.6
Manganese	0.8 to 1.0	0.8 to 1.0

Cupola Patching

To determine the amount of burn-out, the diameters at different zones of the cupola are noted and usually the maximum burn-out occurs at about one foot above the tuyeres. The following figures are typical internal diameters found immediately prior to patching: Cupola hearth 35 in., at the tuyeres 36 in., 6 in. above the tuyeres 46 in., 1 ft. above the tuyeres 48 in., 2 ft. above the tuyeres 41 in.

The cupola is patched after inspection of the melting zone. A fireclay wash is given to the cupola walls especially in the melting zone. Crushed old bricks (*i.e.* grog) with sufficient quantity of fireclay is the best daubing mixture. Thick daubing

* Mr. A. V. Kulkarni is foundry manager of Addison & Co. (Private), Madras, India.

of fireclay only is generally avoided. The daubing mixture consists of 60 to 65 per cent. fire-clay and 35 to 40 per cent. silica sand of 30 to 60 mesh mixed with a minimum quantity of water. The lower the moisture content in the daubing mixture, the quicker and more efficient is the drying.

Where there is deep burn out, fire-brick pieces are embedded in the daubing mixture. The daubed lining is vented with $\frac{3}{4}$-in. steel rods. Many furnace men are of the opinion that by over-daubing and reducing the diameter, metal will not enter the tuyeres and they make a practice of boshing-in the lining above the tuyeres. This can be a source of hanging or scaffolding, especially in Indian conditions where the coke is of poor quality and every precaution is, therefore, taken against this practice.

Cupola Interior

As two different grades of iron are melted daily in the cupola particular attention is given to the slope of the sand bed to avoid dilution of the metal charges. A slope of one inch per ft. is the usual practice and in the Author's foundry a $2\frac{1}{2}$ to 3-in. slope is made towards the taphole. Care is given to the moisture content and strength of the sand as hard ramming and high-moisture content cause a boil of the metal lying on the sand bottom. The cupola breast is prepared with a mixture of 30 to 40 per cent. silica sand and 60 to 65 per cent. red clay mixed with just sufficient water to form a cake and is rammed very hard so that it becomes a compact mass. The height of the slag hole above the tap hole is 17 in. Using a coke of size 4 to 5 in., the void space in the cupola may be assumed as 38 to 40 per cent. The capacity of the well of the cupola is therefore about 2,000 lb. or a weight equivalent to four unit charges.

Charge Details

Particulars of the cupola in use as well as charge details are as follow. Cupola outside diameter 54 in., cupola lined diameter 36 in., ratio of cross-sectional area of the cupola to total tuyere area 4:1, cupola height 18-ft. up to the charging door from bottom plate, height of the slag hole from the tap hole 17 in., metal charge 500 lb., well capacity 2,000 lb. *i.e.* four charges, iron/coke ratio 5:1, limestone per charge 30 lb. centrifugal-fan capacity—driven by 25 h.p. motor—2,800 cu. ft. per minute, blast pressure 16 to 18 in. water, number of tuyeres 5.

Operation

After the cupola bed is well ignited, 50 to 55 lb. of limestone is charged and then charging of the metal commenced. The order of charging is metal, followed by coke and limestone. Care is taken to secure an even distribution of the materials inside the cupola. The cross-section of the cupola may be divided into three zones—(1) the outer zone of maximum temperature, (2) the middle zone of medium temperature and (3) the inner zone of low temperature. Heavy steel scrap and chunky pieces are charged in the outer zone, medium size steel scrap, cast-iron scrap and pig-iron are charged in the middle zone and thin scrap, ferro alloys and limestone are charged in the inner zone. Coke is charged to cover the metal charge.

Charging and Tapping

Coke and metal are charged mechanically, and ferro-alloys and limestone are placed in the proper zones manually.

As soon as the charge level comes up to the charging door the blast is switched on. About 7 to 8 charges are accommodated in the stack. Delay in starting the blast after charging is avoided as premature melting gives cold metal in the beginning.

The first metal is usually observed after seven minutes of starting the blast. The tap hole is kept open to drain out 200 to 225 lb. of initial cold metal and then the tap hole is botted. Three or four taps are opened at intervals of one minute to avoid jamming. The slag bulk increases and hence the melting rate drops down during this period. As soon as slag appears at the level of the lowest tuyere, the slag hole is opened and the slag is drained out. After opening the slag hole, the cupola well is completely drained out till the slag appears at the spout. To minimize metal dilution when changing grades, metal is invariably tapped in quantities equivalent to a unit charge or multiples of unit charges and two charges are tapped consecutively. Further to this purpose prompt tapping and maintenance of the melting rate is adhered to during this period. The initial metal temperature at the spout (measured by an optical pyrometer) is about 1,375 deg. C. and gradually rises to approximately 1,410 deg. C at the seventh or eighth tap.

At the end of the melt it is the practice in this foundry to drop $1\frac{1}{2}$ to 2 charges of metal to minimize the burn out of the cupola lining. The dropped material is sorted out and unmelted metal and return coke are weighed and duly recorded. The weight of the return coke is usually about 400 to 450 lb.

Total-carbon Control

The total carbon of iron melted in a cupola is influenced by a number of factors. Indian coke which is high in ash content makes the coke low in fixed carbon, lowers its calorific value and requires more flux. The volume of the slag increases and as a result more heat is absorbed for its formation, all of which tend to lower the cupola efficiency.

The size of the coke also affects carbon pick-up; bigger pieces do not provide adequate contact with molten metal while too-small a size causes choking up.

The greater the well capacity, the longer is the time of contact of the molten metal with incandescent coke. This increases the carbon pick-up. The blast volume must be in correct proportion to the quantity of coke used. A fluid slag keeps the coke clean and enhances pick-up. The carbon pick-up is also related to the amount of carbon in the charge and is inversely proportional to it.

High manganese in the charge gives a high total carbon, which is also favoured by a neutral or reducing atmosphere. Clean and rust-free steel scrap of proper size is necessary for rapid carburization and quick melting in the cupola.

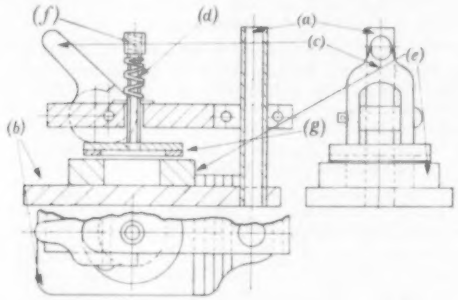


FIG. 1.—*Press for setting CO_2 cores. Key: (a) Main column, (b) base, (c) cam lever, (d) spring, (e) corebox, (f) CO_2 gas inlet, (g) gasket.*

Conclusion

The final section of the paper gave details of inoculation and wedge tests carried out by the Author's foundry and included a number of typical tensile-strength values: grade 17—camshaft, 18.8 tons per sq. in.; cylinder block, 19.6 t.p.s.i.; grade 14—housing, 15.6 t.p.s.i.; manifold, 15.0 t.p.s.i. A complete account of the data relating to each blow was recorded in a cupola log book.

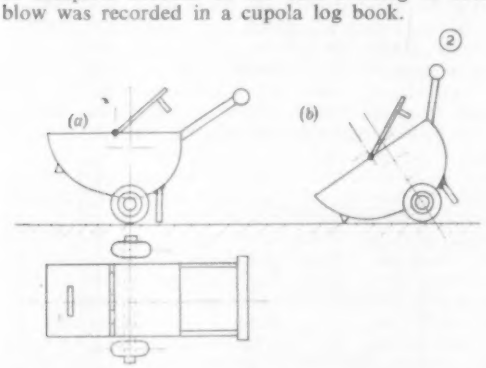


FIG. 2.—*Completely-enclosed barrow used for CO_2 sand. (a) and (b) represent the positions of the barrow when full and only partially full.*

Practical Aspects of Stockyard and Cupola Control

*By B. J. Lombard**

The present-day demands on the grey-iron foundry for metals of definite physical and chemical properties call for a far greater control of the cupola and stockyard area than is normally practised in many foundries. Good housekeeping must therefore be the watchword of every phase and aspect of this vital operation. The consistency of the metal at the spout is in direct proportion to the vigilance given to the running of the cupola and to the selection and preparation of the charge materials. For efficient handling and layout, the Author's foundry installed an overhead crane running parallel to the length of the foundry and adjacent to the cupolas, as well as straddling the railway siding. A five-ton electrically-operated cab-controlled crane, with a two-ton-lifting-capacity magnet as an additional facility, was installed. This simplified the offloading of pig iron, steel and iron scrap which is under the control of the crane operator.

The offloading of coke into tipping bins is a manual operation and owing to its friability every precaution is taken to ensure that the coke is handled as carefully and as seldom as possible.

Bins for Metal Storage

The storage bins are constructed of cast-iron plates 5-ft. long by 2-ft. wide and 2-in. thick, fitting into steel uprights. Each bin has a capacity of either 42 or 84 tons of iron. Flexibility is a feature of the bin construction; the size of bin can easily be increased and the repair and replacement of damaged sides is a simple matter. All bins are clearly marked, indicating the various types of materials stored and have been arranged to keep the distance between them and the mechanical charging skip to a minimum, but still leaving ample room for movement and storage of charging trolleys.

Identification of Raw Materials

To minimise errors in selecting the correct materials, a system of both colour and written identification is in operation. All the raw-material bins carry the name of the material stored, and are marked with a definite colour allocated to that material. This same procedure is followed in order to control the foundry returns, and these, too, are marked with identifying colours to enable them to be placed in the correct bins.

To ensure that the correct colour is marked on the foundry returns, each moulding box or, in some cases, each set of boxes has a colour tag placed on it prior to pouring. In this way, not only does the person in charge of the pouring know what metal is required in each mould, but, when it comes to knocking out the boxes, the colour tag immediately indicates what metal is in the box.

Charge Preparation

Preparation of cupola charges is facilitated by a rail track running parallel to, and in front of, these storage bins. A specially-designed weighing car runs on this track and is pushed from bin to bin to collect and weigh the various charge ingredients.

* The Author is works superintendent at the Vereeniging plant of Central Engineering (Pty.), Limited.

South African Foundry Technology

The first four or five charges are loaded into the cupola from the sill platform by hand, to ensure a better spread of the initial charge onto the bed. Thereafter, mechanical charging is used and the level of the charged material is maintained to the sill door level. The cupolas are conventional 42-in. inside diameter acid, cold-blast cupolas with a 1:4½ tuyere-to-cupola cross-sectional area ratio. The upper-stack area around and below the charging door and chute is lined with interlocked cast-iron bricks. The wind box is placed above the tuyeres and has a perforated diffuser plate above the tuyere outlets to ensure uniform air-supply to all the tuyeres. The tuyeres have shut off doors with sight holes. The air supply is controlled by an air-weight control mechanism placed on the intake side of the fan.

Tapping

A dial scale between the crane hook and ladle is used to weigh the empty ladle prior to its being placed under the spout and, later, the combined weight of the ladle and metal after tapping. A blackboard, placed adjacent to the cupola, is used for the recording of the total charges in the cupola and the progressive weights tapped. With accurate weight control on metal tapped, ferro-alloy additions at the spout can be undertaken with reasonable accuracy, these being made through a funnel into the stream of metal. Cupola-operation sheets are kept daily as well as graphs of cast metal analyses and a close relationship between the laboratory and the foundry results in a uniform product.

Advantages of the CO_2 Process

*By J. L. Handley**

Of the many different methods of mould and core making which have been evolved during the past 10 to 20 years, the CO_2 Process has, in the Author's opinion, given the best all-round results, both economically and from the standpoint of quality. One of the reasons for this can be ascribed to the fact that it has been freely available to all, without the restrictions which have to a large extent retarded progress in other processes. In the Author's opinion, the CO_2 Process has made the same impact on the foundry industry that oil-sand mixtures did some thirty to forty years ago. Oil sand with its high permeability, good dry-strength and breakdown led to the system of making moulds by block cores. One of the major difficulties of this system, however, was that the block cores had a tendency to distort during drying, and the moulder (and at times the pattern-maker) found it necessary to rub the cores to size. Occasionally the patterns were wrong, but "distortion" still took the blame.

* Mr. Handley is foundry superintendent at Stewarts and Lloyds of South Africa, Limited.

With the advent of the CO_2 Process, as we know it today, the distortion problem disappeared as it is now possible to harden a core in its box and turn it out to size, ready for assembly at the casting point.

Experience

The Author described a series of castings made in his foundry with a view to producing them as near to size and uniformity as possible. The prin-

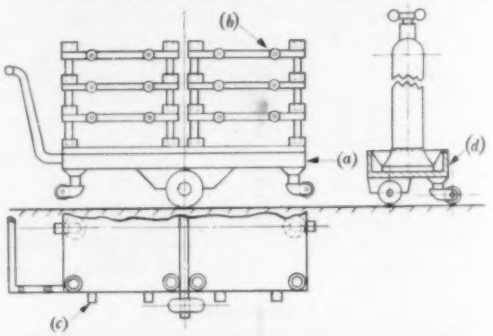


FIG. 3.—*Conveyor for palletized movement of CO_2 cores. Key: (a) Core-transporting bogey, (b) pallets, (c) lifting sockets, (d) CO_2 gas-bottle bogey used in conjunction with a core conveyor.*

cipal factor borne in mind was to assist the machine shop in jigging and tooling for operator-only grade of labour. Although some of the examples shown appeared more suited for cheaper methods of manufacture from a moulding point of view, all aspects, from patternmaking through to machining, were considered, and, by using the

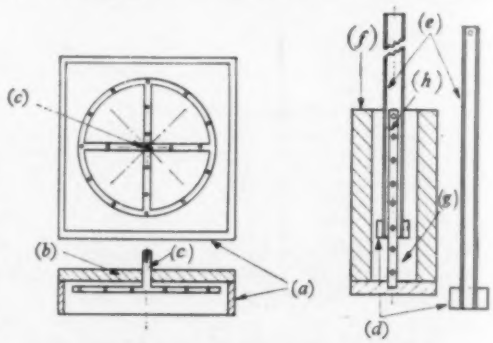


FIG. 4.—*Gassing cover and rammer. Key: (a) Mild-steel frame, (b) hardboard top, (c) gas inlet, (d) rubber tip, (e) rammer, (f) corebox, (g) part of core, (h) perforated tube.*

CO_2 Process, there was a definite overall cost saving. The best results appeared to be obtained by mixing different grades of silica sands and dif-

ferent brands of CO_2 binder. These may be classified as coarse and fine sands and thick and thin CO_2 binders. Generally the CO_2 facing sand for moulds which are "backed up" with black system sand, where the pattern is drawn from the green mould, *i.e.*, before gassing, is a 50/50 mixture of both silica sands and both types of CO_2 binder. This is mixed in a pug-mill and gives the facing sand the necessary bond. For the making of moulds the sand should have good flowability, bond and shelf life. For cores that are "gassed" in the corebox before removal, the sand is mixed in a paddle mixer. In this case, bond is not so important, but good flowability is essential.

The Author referred to a recent article* in FOUNDRY TRADE JOURNAL in which mention was made of the use of a CO_2 binder mixed with an ordinary greensand containing a small percentage of soda. Experiments with this mixture have been carried out and show very promising results.

Equipment

The Author concluded his paper by displaying a selection of CO_2 tools developed and used in his foundry. A press for gassing CO_2 cores is shown in Fig. 1. At (*a*) is a rammed up corebox in position on the base (*b*). Before gassing commences, the springloaded gasket (*g*) is pressed into position by depressing the cam lever (*c*). The arm carrying the gasket and cam lever can be raised or lowered to suit the height of the corebox. The gas is introduced through the screwed socket (*f*). Stops are usually fixed on to the base for locating the corebox. Fig. 2 illustrates a barrow for CO_2 sand distribution. It is totally enclosed to prevent the sand from drying out. The barrow stands in the (*a*) position when full and when only partially full, in the (*b*) position.

The palletized core-transporting bogey sketched in Fig. 3 has two main wheels and two castors, one at the front and the other at the rear. The pallets (*b*) receive the CO_2 cores as they are removed from the boxes which can then be conveyed to the bogey by inserting standard loose pins into the lifting sockets (*c*). In the same illustration, a CO_2 gas-bottle bogey is shown at (*d*) and is used in conjunction with a core conveyor, thus enabling cores to be hardened when travelling on the conveyor. A gassing cover is shown in Fig. 4. This is made using a mild steel frame (*a*) fastened to a hardboard top (*b*). The gas inlet (*c*) is connected to a circular perforated tube inside the cover. The size of the mild-steel frame is slightly smaller than the moulding box thus ensuring that it rests on the sand joint and the weight of the cover is sufficient to make the joint reasonably leak-proof. The perforated tube distributes the gas evenly throughout the mould. On the right of Fig. 4 is a corebox (*f*) being rammed up using a special rammer (*e*) which is a steel tube with a rubber tip. This tip rams the sand hard and, being made of rubber, does not damage the core-

(*Continued at foot of Col. 2*)

box. The perforated tube (*h*) facilitates gassing of the core.

* *Economy with the CO_2 Process*, by D. J. Cousins, January 19, 79, 1961.

Sir John Cass Courses

Sir John Cass College, Jewry Street, Aldgate, London, E.C.3, have arranged the following special courses for the first and second terms, session 1961/62:

"History, Development and Ideas of Mathematics," by J. F. Scott, B.A., PH.D., D.SC. (vice-principal and principal lecturer in mathematics, St. Mary's College, Strawberry Hill, Middx)—a course of about 18 to 20 lectures to be given on Monday evenings from 6 to 7.30 p.m. commencing Monday, October 9; "Advance Courses in Mathematics" (details from B. Spain, M.A., M.SC., PH.D., Sir John Cass College); "Statistical Methods in Scientific and Industrial Research," by A. J. Feuell, B.SC., PH.D., A.R.I.C.—a course of about 20 lectures to be held on Monday evenings at 6 p.m., commencing September 25; "Spectrochemical Analysis," by F. W. J. Garton, B.SC., A.INST.P., F.R.I.C.—a course of 12 lectures to be held on Wednesday evenings from 6 to 7 p.m. and commencing September 27; "Absorption Spectroscopy," by A. R. Philpotts, M.A.—a course of 10 lectures to be held on Friday evenings from 6 to 7 p.m. commencing on October 6; "Experimental Techniques in Physics," by J. A. Pryde, B.SC., PH.D.—a course of about 10 weeks' duration, to be held on Thursdays commencing on October 12; "Radiochemistry and Radioactivity," by A. G. Maddock, D.SC., PH.D., D.I.C.—a course of eight lectures to be held on Tuesday evenings at 6 p.m. and commencing on October 10; "Solid Fuels" (details from the secretary, Sir John Cass College)—to be held on Thursday evenings from 6.15 to 7.30 p.m., commencing on October 12; "Liquid Fuels"—to be held on Monday evenings from 6.15 to 7.30 p.m., commencing January 15, 1962 (full details from the secretary); "Industrial Law," by A. Walton, M.A., B.C.L., barrister-at-law—a course of 12 lectures to be held on Thursday evenings at 6 p.m., commencing September 28; "Trade Marks," by A. Walton—a course of four lectures to be held on Thursday evenings at 6 p.m., commencing May 3, 1962; "Patents and Industrial Design Protection," by A. Walton—a course of eight lectures to be held on Thursday evenings at 6 p.m. and commencing January 18, 1962.

Further details of the above courses, fees, and enrolment forms can be obtained from the secretary, Sir John Cass College, prior to the opening dates quoted.

TI's "Adventure Centre"

Sir John Hunt, director, Duke of Edinburgh's Award, opened on September 15 the new "Adventure Centre" at Pont-y-Pant, near Betws-y-Coed, Wales, established by Tube Investments, Limited, for its young employees of both sexes. The first of its kind started by a company, the centre consists of a country mansion set in its own estate, from where mixed parties will be introduced, summer and winter, to mountain activities and skills of living in the open, etc.—the girls being expected to share equally in all the arduous exercises with the boys. Since early Spring, large contingents of TI's young employees have volunteered their week-end services in preparing the mansion for its new purposes—including the laying of new drainage, installation of central heating, and complete redecoration.

German Foundrymen's Technical Association

Annual Meeting in Düsseldorf

The *Verein Deutsche Giessereifachleute* (German Foundrymen's Technical Association) is holding its 52nd annual meeting in Düsseldorf from October 4 to 6. The opening ceremony will take place in the Robert Schumann Hall at 9 a.m. on the Thursday when Dr. R. Spolders (president, VDG) will welcome members. That day's proceedings will include a "beer-sampling evening" at 7 p.m. on October 4 in the century-old cellar of the Dieterich brewery, 20, Duisburger Strasse. The annual general meeting for members only will commence at 2.30 p.m. and this will be followed by technical sessions which will continue also on the Friday. On Friday evening, there has been arranged a social evening commencing at 8 p.m. in the Rheinhalle, with a music-hall and concluding with dancing. A buffet bar is to be open for refreshments.

Technical Sessions

On the Thursday and Friday, two simultaneous technical sessions will be held in the Robert Schumann Hall and the Kleinen Congress Hall. Dr. Spolders is to open the series to be held in the Robert Schumann Hall and Director P. Schiegries will address the assembly in the Kleinen Congress Hall. Papers to be presented are as follow:—

(1) "Calculation and Application of Exothermic Heating Pads on Steel Castings," by R. Wlodawer; (2) "Precision Investment-casting Process To-day," by Dr. E. G. Nickel; (3) "Fundamental and Applied Research in the Field of Foundry Technology," by Prof. K. Löhberg; (4) "Continuous Casting of Large Hollow Castings in Non-ferrous Metals," by H. Mann, A. Körch and E. Tuschy; (5) "Nickel as an Alloying Element for Copper-base Casting Alloys," by E. Weisner; (6) "Possibilities of Automation in the Production of Pressure-die-castings," by G. Lieby; (7) "Dross Inclusions in Heavy Iron Castings," by A. Dahlmann; (8) "Equilibriums of Solid Iron with Slags consisting of Iron Sulphide, Ferrous Oxide and Iron Silicates," by Prof. E. Schürmann; (9) Measurement of the Mould-filling Capacity in the Systems Al/Cu and Al/Si," by H. Brand; (10) "Titanium-containing Aluminium/Copper Casting Alloys," by H. Dieckmann; (11) "Transfer of Liquid Metal to the Mould," by W. Büchen; (12) "New Method for the Determination of Compressive Stresses in Hot Moulding Sands and the Relationship between Stress Values and Casting Defects," by Prof. W. Patterson, D. Boenisch and K. Gabler, and (13) "Comparative Investigations on the Machinability of Malleable Castings," by C. Weber.

On the Friday morning at 11 a.m., members will be entertained by the orchestra of the Bach Society, Düsseldorf, conducted by Prof. J. Neyses.

SHEFFIELD CORPORATION'S parliamentary and general purposes committee recommended on September 18 the approval in principle of a proposal to reserve a site of nearly 20 acres at Parkwood Springs, Neepsend, for a permanent central helicopter station. The site would take twin-engined machines. The committee similarly recommended the use of part of a site at Redmires as a short-term landing ground for single-engined machines. The committee abandoned any idea of establishing a municipal airport for fixed-wing aircraft at the Redmires site.

Safe Practices when using Hoisting Tackle

In a recent issue of *Safe Times*, published by the British Safety Council, there is a usful practical article on the use of slings, ropes, chains and hoisting tackle, in which are listed the "do's" and "don't's" of safe practice, as follow:

Do's: Included in the "do's" are: (*a*) Know the weight being lifted and allow for the weight of the tackle; (*b*) always select lifting tackle of adequate strength and see that it is properly marked, no chain or rope should be used for any load exceeding the safe working load; (*c*) see that end-links, rings or shackles are riding freely on any hook on which they hang; (*d*) take care when using collar slings that the lifting hook does not bear on the small end of the "egg" link; (*e*) use wood or other packing to protect the sling from any sharp edges on the load, and (*f*) avoid shocks due to the load slipping or snatch in starting as the stress on all gear is much greater if the load is applied suddenly.

Don't's: Next, the article lists eight "don't's" as follow: (*a*) Never use an excessively pitted, corroded or worn chain; (*b*) never use a chain in which links are locked, stretched, or do not move freely; (*c*) never join chains by bolting or wiring links together; (*d*) never shorten a chain by tying knots—use an adjuster or keep an adequate supply of slings of suitable length; (*e*) do not drag a chain from under a load or drop it from a height; (*f*) do not hammer a link to straighten or force it into position; (*g*) do not use the load chain of a block as a sling by hooking round the load, and (*h*) do not carry idle slings on the crane hook at the same time as a loaded sling.

Standard Requirements

The Chain Testers Association of Great Britain recommends a standard normal practice of marking and certifying multi-leg slings with the safe working load at 90 deg. between legs—above 90 deg., the safe working load decreases rapidly. Endless chain-slings must be used with care to avoid possible overloading or damage to links by bending too sharply, and the Association recommends a standard normal practice of marking and certifying endless slings with safe working loads equal to 1¼ times the load on the single chain, thus allowing some margin of safety for varying conditions of use. Dealing with wire-rope slings, the article stresses that these should never be sharply bent at any point, should never be in contact with hot metal and should not be allowed to become rusty.

Finally the article states that the Law requires all lifting gear to have been tested, examined and certified when new and again after repair; the safe-working load of all lifting tackle in use to be either stamped upon the gear or exhibited on a chart prominently posted, that all lifting gear shall be examined by a competent person at least once every six months, and wrought-iron chains and fittings must be annealed at certain specified intervals.

THE INSTITUTE OF PERSONNEL MANAGEMENT is organizing a five-day residential study course in "Employment Procedures" from October 23 to 27. It is to be held at the Prince of Wales Hotel, De Vere Gardens, Kensington, London, W.8. Details can be obtained from the Institute, 80, Fetter Lane, London, E.C.4.

In the Land of Forge and Forest . . .

. . . the Newcomen Society traces Historic Links with Britain

This year the Newcomen Society went to Sweden for its summer meeting. Thirty members and ladies from Britain and a small but welcome group from other countries (America, Canada, Holland, Eire and Sweden itself) assembled in Stockholm on June 11. If any of them were unaware of the historical links between Britain and Sweden in the field of iron and steel manufacture as well as engineering, they soon found that their Swedish hosts were not only well informed on the subject but had been at pains to preserve evidence of this association.

A "beat-the-clock" programme for the visit of the Newcomen Society to Sweden this summer had been devised by Dr. Torsten Althin, director of the Museum of Science and Technology in Stockholm. It was due to his enterprise and enthusiasm that so many relics of Swedish industry and invention could be inspected in the space of six days and in such friendly circumstances. In one respect the round trip of 400 English miles on Swedish soil was a pilgrimage, though never a solemn one. It began on Monday, June 12, in Dr. Althin's own museum, which came into being and is maintained by donations from private organizations and individuals. There, in the Machinery Hall, is a model of Sweden's first steam-engine, built on Thomas Newcomen's "fire and water" principle by Mårten Triewald in Stockholm in 1728. Triewald had sojourned in the North of England, where he had made practical studies of Newcomen's constructions, and his engine (the third steam-engine in the world outside Britain, and the first on Scandinavian territory) was put to work at Dannemora, pumping water from the ancient iron-ore mine. From that mine and the nearby forge at Osterby Bruk, Sheffield obtained supplies of Swedish iron for its edge-tool industry in the 17th century.

Triewald's engine worked until 1735, when it was damaged by storm; it was not rebuilt, but the engine-house survived and is preserved as an industrial monument by the AB Dannemora Gruvor. Three days after the Society members had seen the model engine in Stockholm, they arrived at Dannemora and were able to enter the engine-house (which stands close to the old open pit) and inspect some of the contemporary tools and equipment which have been gathered under its roof. During the visit the company announced that a new trade emblem, showing the engine house, and the old and new mine shafts was being introduced.

Cylinder cast in Halves

Although Triewald's engine was lost to posterity, another historic engine built in Stockholm by an Englishman met with a happier fate. Samuel Owen, trained at Boulton and Watt's works in Birmingham, settled in Sweden, and the beam-engine he built for the Höganäs coal mine in 1832 has a prominent place in the Museum. It is the oldest extant steam-engine in the country. The story goes that the cylinder was cast in two halves, and the upper half was found to be ¼-in. too wide. As there were no lathes of a size to deal with so large a casting, it was carted to the mine and there laboriously reduced to size by hand tools.

Foundrywork is represented in the iron and steel section of the Museum, and in other sections. There are cast cannon, bells, firebacks (mainly 18th-century), cast-iron garden furniture and some fine art-castings, as well as a selection of old foundry tools and a moulding machine of 1883. More spectacular, perhaps, are the reproductions of a Lancashire forge and an iron-ore mine, the latter faithfully depicting methods of mining from the 13th century to the present day.

From their inspection of early engines used in the mines and factories, the visitors turned to steam power in transport. The locomotive and carriage section of the Swedish State Railways Museum is situated at Tomteboda, a little way outside the centre of Stockholm. In that collection of two-dozen locomotives and 30 carriages there are several from Britain. Manchester, Birmingham, Loughborough, Bristol and Swansea firms are represented, some of them still active. The oldest British engine in the Museum is the "Prince August" supplied by Beyer Peacock & Company in 1856, the firm which also supplied Sweden with her first express locomotive (1866), nicknamed "The Spinning Wheel" on account of her big driving wheels. The two oldest coaches in the collection came from England (Wright & Son, Birmingham) in 1854.

Maritime Museum

The next port of call was the National Maritime Museum, which combines exhibits of the Swedish Royal Navy and the Mercantile Navy. Samuel Owen built the first Swedish steamship, "The Witch of Stockholm," which was ready for trials in Stockholm in 1816. Sweden's first naval vessel driven by steam was a paddle-driven corvette, "Thor" (1841). These vessels and many others are represented by models of the period, and many specimens of the founder's art in the 16th-18th centuries are on show, in the shape of ornate cannons and ships' bells and other ships' fittings.

It was natural, indeed inevitable, that having

Newcomen Society's Visit to Sweden

inspected museum relics of Sweden's navies the visitors should wish to see the "Vasa," the great warship that foundered and sank in 1628, at the very start of her maiden voyage and within sight of the yard where she was built. The romantic story of her rediscovery and recovery is still fresh in the public mind, for it was on April 24 of this year that she was brought to the surface, after three centuries' immersion in the waters of the Baltic. The originator and moving spirit of the salvage project, Mr. Anders Franzen, a member of the Newcomen Society, met the party at the Gustav V dry-dock at Beckholmen, where the "Vasa" rests on a concrete raft awaiting reconstruction and a fitting resting place. He spoke to the visitors of the early efforts to recover the ship and her valuable armament—64 cast-bronze cannon weighing in all nearly 80 tons, and mentioned that Jan Bulmer, "engineer to His Majesty The King of England," had started a brave but fruitless attempt to raise her only three days after the disaster occurred, on a "no cure, no pay" basis. But it was not until 1664 that the first of the cannon was recovered and 53 at least had been raised by the following year with the aid of a primitive leaden diving bell. One of the guns raised this year, a highly ornamented 24-pounder weighing 2,500 lb., was cast in a bronze containing 92 per cent. of copper. The "Vasa" was one of the four warships ordered in 1625, and the gun-founders' task to produce the cannon for all of them would doubtless make a story worth telling at an international gathering of foundrymen.

Copper Production

The supply of copper would have been no problem in those days, for the ancient mine at Falun—worked continuously since A.D. 1100—was producing 3,000 tons annually in the mid-17th century. The Society visited this mine on June 16. The Great Pit, as it is known, resulted from the caving-in of several separate open workings in 1687, which formed the vast cavity some 400 yards long and 280 yards wide, with a depth of 310 feet. The old Stora Kopparbergs Bergslags Company had direct associations with the Swedish Crown and State from the 13th century down to 1862. By then the exploitable copper-ore was nearing exhaustion, and the manufacture of copper ceased in 1895. To-day, the mine yields about 140,000 tons of ore a year, mainly of pyrites (for the company's chemical industries), the balance making zinc and lead concentrates, and about 2,400 tons of copper concentrates (15 per cent. Cu). The Stora Kopparbergs Industrial Museum is housed in an 18th-century building (at the edge of the Great Pit) which was once the head offices of the company. It contains all manner of relics of the historic mine, including models of machinery designed by Christopher Polhem, the famous Swedish engineer and inventor, who was employed at Falun as technical director from 1700 to 1710. Stora began to produce iron in the 18th century and some of the rooms in the Museum illustrate the development of the blast-furnace, wrought-iron production and (in recent times) the sponge-iron process and electric steel-making. The Stora Company's main interests to-day are divided between iron and steel production and forestry.

Forges

Sweden's abundant water supply, which provided power for several hundreds of small forges 100 years ago, later made possible the extensive use of the electric furnace for steelmaking, so that Swedish special steels are now as famous as her bar-iron was in days gone by. Several of the old forges have been preserved as museums. The one at Osterby Bruk is the oldest extant forge in Sweden, worked down to about 1900. It was inspected on June 15. Osterby was associated with Louis de Geer, the dominating figure in the Swedish metal industries in the 17th century, and with an output of about 1,000 tons a year, it was once the largest forge in all Europe. The second forge museum the Newcomen Society visited—on the last day of their meeting, June 17—was the Steelworks Museum of Surahammar, dating back to the 1840s, and put into its present order in 1950. The buildings are picturesquely sited on the Kolbäck river, which drove a hammer-mill at that spot as far back as 1650. Many of the machines and tools stand in their original positions in the old workshops. Wood-fired puddling furnaces (1845) and the water-driven hammer-mill are flanked by later machinery—the rolling mills for bars, sections and plates; a wheel forge for railway wheels, and a Lancashire hearth. Auxiliary machinery from England appears in the collection (surprisingly including an early sand-blasting machine) and the name of Samuel Owen again crops up, here in connection with some of the rolling-mill gear, which is believed to have come from his Stockholm workshop.

A few hours before their arrival at Surahammar —the company is now part of the ASEA group and makes ingot moulds, steel castings and foundry pig-irons, in addition to steel products—the members saw Swedish charcoal-iron being made by the old Lancashire method. This was at the works of Ramnäs Bruks AB, where the process has been continued ever since 1855. The sight of the smiths applying their craft in an everyday production setting was a profoundly interesting experience for the members, because it invested with reality all the word-pictures of the process which had been given them in the tranquility of the museums.

Bessemer and Göransson

Another historic link between Britain and Sweden brings together the names of Bessemer and G. F. Göransson, and led the party to Sandviken and then to Edsken. At the offices of Sandviken Järnwerk AB, documents relating to Göransson's successful exploitation of Bessemer's invention were inspected on June 16. Göransson

acquired one-fifth of the Swedish rights in 1856, and by July, 1858, had succeeded to the point of starting regular production of Bessemer-steel ingots. The converter equipment was supplied by W. & J. Galloway of Manchester and installed at Edsken, where the experiments began in November, 1857. Their successful outcome resulted in the establishment in 1862 of the steelworks at Sandviken. A full account of these eventful years was presented to the Iron and Steel Institute in 1958 by Mr. Per Carlberg (see *JISI*, 189, July, 1958). Mr. Carlberg accompanied the Newcomen Society party throughout their Swedish tour, and it was he who acted as their guide at Sandviken and at Edsken. A blast-furnace had been worked at Edsken since 1664, and the remains of the furnace which produced the pig-iron for Göransson's pioneer steel-making work have been preserved as an open-air industrial museum, in much the same way as (more recently) the furnace at Coalbrookdale has been preserved. The Edsken visit was one of the highlights of the summer meeting. The columns of the furnace and the waterwheel that worked the blowing engines stand in a quiet forest clearing, now remote from scenes of industry. Yet it was at this spot barely more than 100 years ago that Göransson and his band of workpeople laboured to produce the first ingots of Bessemer steel.

In the centre of Sandviken stands the large steam-hammer supplied to the steelworks in 1863 by Kirkstall Forge of Leeds. Also preserved in the Sandviken archives is the drawing of a centrifugal casting machine designed by G. F. Gahn in July, 1861, for making the tyres of railway locomotive wheels. Gahn was a young Swede with Scottish ancestors. His machines were used first at Edsken, and a battery of them was later installed at the Sandviken works. The machines were built in Stockholm, and the construction and operation attracted some unwelcome "snooping" by an English firm, said Mr. Carlberg.

The remaining visits were varied, to say the least: a fine collection of 17th century hand-tools at Skokloster Castle (better known for its collection of armour), a linseed windmill lately restored at Waldemarsudde, and (jumping from the past to the present) the L. M. Ericsson telephone, radio and television works. Throughout the tour the party was greeted and entertained with great cordiality and some return and acknowledgment of this were made possible when the Society held its annual dinner in Stockholm on June 13. More recently the Newcomen Society arranged a luncheon in honour of Dr. Torsten Althin while he was on a visit to London. This was an "Elizabethan" meal, served at the Gore Hotel, Kensington.

Forthcoming Events

OCTOBER 2

Institute of British Foundrymen

Sheffield and district branch: Presidential address by R. V. Riley, 7 p.m., at Sheffield and Ecclesall Restaurant, Ecclesall Road, Sheffield.

OCTOBER 3

Combustion Engineering Association

Western region: "Factories Acts in relation to Boilers and Pressure Vessels," by H. Entwistle, H. M. Engineering Inspector of Factories, 10 a.m., at the Park Hotel, Cardiff.

Institute of Metals

Oxford local section: "High-temperature Alloys," by W. Betteridge, 7.15 p.m., in the Cadena Cafe, Cornmarket Street.

OCTOBER 4

Institution of Plant Engineers

Southern branch: "The Plant Engineer and Works Study," 7.30 p.m., at Eastleigh Technical College, Chestnut Avenue, Eastleigh.

OCTOBER 5

Leeds Metallurgical Society

"The Strength of Alloys," by Prof. R. W. K. Honeycombe, 6.30 p.m., at the University Staff House, University Road, Leeds.

National Trades Technical Societies

South Staffordshire section: "Modern Methods of Pattern-making," by a representative of Wilkinson, Limited. (Details from secretary.)

OCTOBER 7

Institute of British Foundrymen

West Riding of Yorkshire branch: "Review of Work by the Technical Council on the Influence of Cooling Rate on the Properties of Iron Castings," by M. M. Hallett, 6.30 p.m., at the Bradford Institute of Technology.

Wales and Monmouth branch: "Brains Trust" with B. Williams, W. Rogers, K. G. Harris, and D. Gaze on the panel under the chairmanship of L. Duddridge, 6 p.m., at the Royal Hotel, St. Mary's Street, Cardiff.

Plaque to commemorate Charles Manby

At the suggestion of the Newcomen Society, which exists to promote the study of the history of engineering and technology, the London County Council is to erect a plaque at 60, Westbourne Terrace, Paddington, to commemorate Charles Manby, civil engineer, who lived there from 1870 to 1876.

In 1821, with his father, Charles Manby, who was then 17, laid down the Aaron Manby, the first iron steamship to make a sea voyage. The hull was built at Horseley Ironworks which had been established by his father. At 19 Manby undertook the construction of gasworks in France and, subsequently, constructed a number of marine engines for the French Government.

In 1829 he returned to England and became manager successively of the Beaufort Ironworks and the Ebbw Vale Iron Company, where he introduced several modifications in the rolling of rails. Six years later he moved to London and devoted himself to the introduction of a system of warming and ventilating buildings, known as Price and Manby's system.

He was actively engaged in the staging of the Great Exhibition of 1851 and later was a member of the International Scientific Commission held to consider the construction of the Suez Canal. When he died at the age of 80 he had served for nearly half a century as secretary (acting or honorary) of the Institution of Civil Engineers and its high standing and prosperity were largely his achievement.

SMITH'S DELIVERY VEHICLES, LIMITED, have completed a 132,000 sq. ft. factory on the Team Valley Industrial Estate, near Newcastle, at which production will start in November. Electric vehicles to be manufactured there will incorporate new features including the use of transistors and electronics.

Personal

MR. GORDON M. MORRISON has been appointed a director of Barr & Stroud, Limited.

Mr. R. STERNBERG has been appointed a director and vice-chairman of Millspaugh, Limited.

Mr. LEIGH H. KERFOOT has been appointed to the board of Thomas Kerfoot & Company, Limited.

Mr. G. S. W. MARSHALL has been appointed a director of Capper Pass & Son, Limited, in place of Lt. Col. S. G. C. MACWATTERS, who has retired.

Mr. NORMAN READMAN has become chairman of Consolidated Pneumatic Tool Company, Limited. He is succeeded as managing director by Mr. S. H. IRELAND.

Mr. FREDERICK T. JONES has been appointed a director of Microcell, Limited, a subsidiary of B.T.R. Industries, Limited. He had been production manager with Hunting Aircraft, Limited, since 1955 before joining Microcell.

Mr. J. O. TAUDEVIN, managing director of John M. Moorwood, Limited, Sheffield, will be among those attending the meeting of the Iron and Steel Institute in America in October. Mr. Taudevin is chairman of the Roll Makers' Association of Great Britain.

Mr. V. BRACKENBURY (director, Sterling Foundry Specialities, Limited) carried off the Challenge Cup at the IBF Golfing Society's meeting last weekend at Woodhall Spa. He is a member of the London branch of the Institute. (Details of the function will be recorded shortly.)

Mr. P. W. HOWARD, having attained the age of 70 years, is retiring from the board of BTR Industries, Limited, of which he is deputy chairman, on September 30. He joined the company, then British Goodrich Rubber Company, in 1926, became a director in 1949 and was appointed managing director in 1951. He relinquished the latter post in 1959.

Mr. J. H. HORNE has been appointed company youth recruitment and training officer, and Mr. J. C. WOOLHOUSE, staff training officer to Rolls-Royce, Limited, Derby. Mr. Horne is a member of the SBAC Standing Committee on Education and a member of the East Midlands Regional Advisory Council for Further Education. He joined Rolls-Royce 12 years ago.

Mr. D. PARRY DAVIES has been appointed a director of Mond Nickel (Retirement System) Trustees, Limited, and is succeeded as comptroller of the International Nickel Company (Mond), Limited, and Henry Wiggin & Company, Limited, by Mr. L. C. H. Voss. Mr. C. W. R. EDWARDS has been appointed secretary of the two latter companies in succession to Mr. E. VAUGHAN, who remains a director of both companies.

In recognition of his 50 years' service with the company Mr. ARTHUR ALLEN has been presented with a television set by Mr. Frank Morris, chairman of Herbert Morris, Limited, of Loughborough. Mr. Allen has spent the whole of his working life in the drawing office, and is a designer. For many years he was a part-time lecturer of engineering subjects in the Department of Further Education at Loughborough College.

Mr. J. A. R. STANIFORTH, formerly joint managing director, has been appointed managing director of Constructors John Brown, Limited. Mr. R. M. WYNNE-EDWARDS has relinquished his appointment as joint managing director but will remain on the board. Mr. H. D. WALKER has retired from the board of CJB but will continue to be associated with the company as a consultant and as a director of two subsidiary companies.

Dr. D. H. SHARP has been appointed director (technical) of the Federation of British Industries as from November 1. He will take up the appointment on the retirement of the present technical director, Major-General A. J. H. DOVE, who is leaving the Federation at his own request at the end of October in order to devote more time to voluntary work. At present Dr. Sharp is assistant to one of the managing directors of Fisons, Limited.

Dr. T. P. HUGHES, who has been in charge of new research laboratories for Tube Investments, Limited, has been appointed joint assistant managing director of the B.B. Chemical Company, Limited, Leicester. He was formerly head of the chemistry department of the Royal Aircraft Establishment at Farnborough, and later chief superintendent of the Rocket Propulsion Department. From 1940 to 1947 he was with the Shell Petroleum Company, Limited.

Mr. John Boyd-Carpenter, Minister of Pensions and National Insurance, has appointed Mr. K. R. MALCOLM, deputy registrar of non-participating employments, to be registrar of non-participating employments with effect from September 11. He succeeds Mr. N. LEACH, who is taking up a post as under secretary with the Department of Technical Co-operation. Mr. A. J. ASHMAN has been appointed deputy registrar of non-participating employments.

It is announced that Mr. H. J. PROFFITT is joining Morganite Crucible, Limited, Norton, Worcestershire, on October 1 next, when he will be taking up an appointment as technical specialist responsible for development. Mr. Proffitt has currently held appointments as development metallurgist and latterly as melting technologist with High Duty Alloys, Limited, Slough. He is an associate of the Institution of Metallurgists, a member of the Institute of Metals, a member of the Institute of British Foundrymen and is currently the president of the Slough section of the latter. Mr. Proffitt is also a member of IBF technical sub-committees.

Mr. ERNEST HOULDER, head of the experimental melting section of the research department of Jessop-Saville, Limited, Sheffield, retires at the end of this month after over 54 years' service with the firm. He started at the Brightside works as a cellar lad in 1907 at 10d. a day. About 34 years ago he cast the first magnet ever made by the firm. In 1939 he succeeded his father, Mr. Harry Houlder, as manager of the crucible department. Their combined family service is 114 years. Mr. Houlder moved to the research department in 1945, when the crucible department closed down because of the introduction of electric melting, and was the first melter on the electric-arc furnace.

Following the recent announcement that the Garrard Engineering & Manufacturing Company, Limited, has become a wholly-owned subsidiary of the Plessey Company, Limited, the formation of a reconstituted board of directors is announced by Plessey. New directors are:—Mr. A. E. UNDERWOOD, chairman; Mr. HECTOR V. SLADE, managing director; Mr. K. J. SLADE, Mr. J. TYLDESLEY, Mr. JOHN A. CLARK, and Mr. MICHAEL W. CLARK. Plessey also announces that Sir WILLIAM STANIER has resigned from the Garrard board, and has been appointed a director of Machine Products, Limited. Mr. DONALD F. BROWN has also resigned from the Garrard board and has joined the board of Hawley Products, Limited. Machine Products and Hawley Products are in the Plessey group.

Holding Cores Down

Practical Suggestions for Accurate Sprigging

By "Checker"

Internal cores have sometimes to be held in position in the mould with sprigs, to ensure they will not be moved out of position. On these occasions, it is usually much better, to make the necessary holes for the sprigs through the cores, before they are sent to the core stove. As this

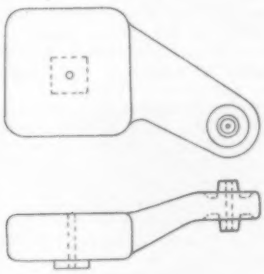


FIG. 1

FIG. 1.—*Sprigs to secure this core in position will be inserted in the holes indicated by the dotted lines shown in the side elevation.*

cannot always be done efficiently after the core has been taken from its corebox, it is desirable to have provision made in the corebox for this purpose.

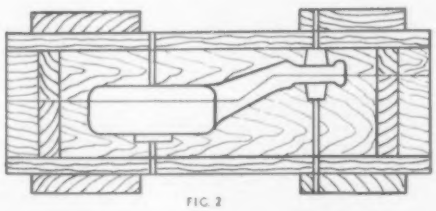


FIG. 2

FIG. 2.—*Section through the corebox indicating how the guide-holes are matched in the top and bottom halves, to ensure accurate location of the sprigs.*

Location

The core illustrated in Fig. 1 is fixed into position in the mould with two sprigs, and the holes that are required for this purpose can be seen dotted. The hole in the large end of the core can vary in position to a certain extent without any difficulty being encountered. At the other end, however, a reasonable degree of accuracy is essential, to guarantee that the sprig hole is central through the small protruding parts on each side of the core. Should this hole be misplaced so that it came out near the core edge, there would be the possibility of the core breaking away when the sprig is pushed into place.

To guarantee these holes being situated correctly in the core, the position of the required holes should be carried right through the corebox bottoms as illustrated in Fig. 2. The holes should first be made in one half of the corebox, drilling from the inside so that the correct positions are easily obtained. Then the two half coreboxes can be placed together on their dowels, with the drilled

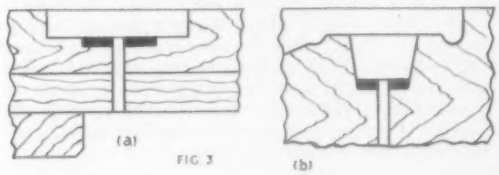


FIG. 3

FIG. 3.—*Where the corebox is required for long production runs reinforcement inserts maintain the serviceability of the guide-holes.*

half on the top. The holes already in this top half, will act as a jig for the drill as it goes through to bore the holes in the bottom half, and will ensure that the holes in both halves are in line. The core shown in Fig. 2 has first to be made in halves, and when both parts of the core are made, the two half coreboxes are placed together. A

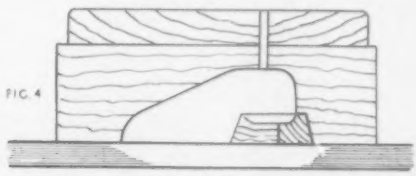


FIG. 4

FIG. 4.—*With an open-top corebox the sprigging guide-hole is made by drilling the box from the outside.*

straight wire of the desired thickness can then be pushed through the core from the corebox top, with the drilled holes acting as a guide. The hole in the bottom half box should be found without difficulty, for the wire to enter. This method will guarantee that the holes in the cores will always be in the same relative position.

Reinforcement

If a large number of cores are to be produced

Holding Cores Down

from the corebox, it will be found that the wire being pushed through the core, will eventually mark and disfigure the wood around the hole in the bottom part of the corebox. This can be remedied by cutting out a recess round the hole about 1-in. square and ¼-in. deep and fixing in a piece of brass or other suitable metal, of the same size and thickness, as shown in part section Fig. 3 (a). At the other end the metal should be made to fit the full diameter at this part of the core as shown in the section Fig. 3 (b). If desired this metal insert can be made at the top and bottom of each hole, the pieces of metal being fixed into place with small wood screws.

Open-top Corebox

When a core is made from an open-top corebox, and requires a hole through for sprigging purposes, the hole is drilled through the corebox bottom, as illustrated in Fig. 4 which shows a section through the centre. Then, when the core has been made, and the corebox turned over on to the coreplate before withdrawing, the required sprig hole is made by pushing a straight wire through the hole in the corebox bottom, and the core, until it makes contact with the bottom plate.

Production Control Conference

A Conference, under the title "Production Control as a Means to Higher Productivity," has been organized by the Willesden & Hendon Productivity Association (affiliated to the British Productivity Council) and will be held at the headquarters of the Federation of British Industries, 21, Tothill Street, London, S.W.1, on November 22, 1961. The chairman will be Mr. J. R. Wilkinson (director and general manager, Associated Electrical Industries (Manchester), Limited, switchgear division), and the speakers Mr. G. A. Hutcheson (managing director, National Union of Manufacturers Advisory Service), Mr. F. E. Pearce (director of sales, Personnel Administration, Limited), Mr. G. Y. Elliott (senior consultant, Personnel Administration, Limited), and Mr. R. S. Geoghegan (director, E. G. Brisch & Partners). Admission fee for the Conference will be three guineas, and requests for details and reservations, together with remittance, should be sent to Mr. D. I. Duncan, A.E.I. Switchgear Division, 20, Neasden Lane, Willesden, London, N.W.10.

BISRA Display and Information

For the convenience of those who were able to visit the British Iron and Steel Research Association's Sheffield station during the open days in June, and others interested in the Association's work, a set of notes has been compiled by the Association. Entitled "Summary of Displays and List of Associated Literature," these notes consist of slightly condensed versions of the information that appeared on the display boards relating to each exhibit, and a complete list of the literature that is available in each case. Copies of these notes are now available, free of charge, from: The Information Officer, Development and Information Services, BISRA, 11 Park Lane, London, W.1.

Accidents and the Foremen

A new approach to accident prevention in industry by training foremen in safety measures, is being launched by the British Safety Council. It is planning a nationwide series of training courses directed to these executives, the first of which will be held in London in October. They are being organized by Mr. Arthur Greenslade, who has joined the Council as head of the training division. "The 25 per cent. increase in accidents to young employees over the past two years, would suggest that present methods of accident prevention in factories are ineffective," said Mr. Leonard Hodge, the Council's National Director. "We believe the foreman is the key figure in accident prevention. Unlike the safety officer, he is on the shop floor all day long, he can see where the faults lie and can talk more easily to the young people," he said. In factories in other countries where foremen have been specially trained in safety, a significent reduction in accidents has generally followed.

The courses (see below) will last for four half days, each being followed by an examination. "In the series we have planned, courses will be held in most of the major cities, but we are prepared to hold them anywhere in the country where we can get 30 foremen together," said Mr. Hodge. The Council believe that by taking safety to industry in this way, managements will be more willing to co-operate than if the courses were held centrally.

Foremen will receive instruction in basic accident prevention, and they will also be able to put specialized question to the instructors. So far, safety training has been in the form of written instruction, and as the figures illustrate—26,000 youngsters injured the last two years—this had insufficient effect. The Council are confident that by training the foremen to a high standard of safety-consciousness, they can save the country many of the 20 million working-days lost annually—a loss about five times as great as that caused by strikes. Application forms and further details are available from Safety House, 60, Westbourne Grove, London, W.2.

SYNOPSES OF SAFETY COURSES

(1) *Accident Prevention.*—Recognition of the problem; cost of accidents to the individual, to the employer, to the nation; responsibility for accident prevention; accidents are caused—they do not "just happen"; repercussions of industrial accidents, and the need for safety consciousness.

(2) *Machine Guarding.*—Requirements of the Factories Act; types of hazard; different types of guard, and associated hazards-maintenance, etc.

(3) *Protective Equipment.*—Protective devices necessary under official Regulations for some industries; personal protection should really represent a last line of defence, and description and examples of devices and their application.

(4) *Fire Prevention.*—The "triangle of fire"; prevention of hazards; classes of fire and the types of extinguishers to be used, and alarms and sprinkler systems.

(5) *Good-housekeeping.*—The need for "good-housekeeping" in the accident-prevention programme, and good-housekeeping inspections.

(6) *Handling of Materials.*—Correct manual lifting method; manual lifting aids, and lifting tackle.

Films will be used throughout the course, also examples of protective equipment in use will be shown.

Japanese Study Team visits UK

A study team of 34 foundrymen from the Japanese shell-moulding industry touring Great Britain, were schedu'ed on Wednesday and Thursday of this week to visit several equipment-manufacturing and foundry concerns. On Wednesday they toured the works of Foundry Equipment, Limited, at Leighton Buzzard, and to-day (Thursday) some of the members will be visiting works of the Owen Organization in the Midlands, and others, Alumasc, Limited, of Burton Latimer.

Sculptor uses New Foundry Technique

Application of "Disappearing" Polystyrene Patterns

Through the centuries, the traditional tools of the sculptor's trade have been the chisel and mallet, his raw materials marble and bronze. Yet a successful space-age sculptor may use materials more at home in the pages of science fiction and combine them with the products of the plastics industry to interpret forms and shapes of his twentieth-century artistic imagination.

Geoffrey Clarke, at 36 one of Britain's much-sought-after sculptors, has recently used "Styrocell"* to make the pattern for his latest commission—a stained glass and aluminium form (Fig. 3) for the new technical college at Ipswich opened by the Queen last June. At his home at Hartest, in Suffolk, Clarke has built himself a foundry to do his own casting; the metal he uses is LM-6, aluminium/silicon alloy, and the other main tools of his trade are just a furnace (Fig. 1) and a sand-bed.

Clarke heard about the use of expanded polystyrene for art-foundry work in America† but believes he is one of the first to apply it in this country. Briefly, the steps he takes to achieve the result, first conceived in a rough sketch, are as follow: In his workroom he cuts out a pattern (Fig. 2) from blocks of "Styrocell" using a home-made hot-wire tool for the job. When he is satisfied that the pattern he has made up is exactly as he wants to see the casting in the finished form, sections of the pattern are transferred to his foundry where piece-by-piece they are set into a moulding box. The "Styrocell" shapes are packed around with sand and molten aluminium is then poured in. The expanded plastic material melts and

* Expanded polystyrene made by the Shell Chemical Company, Limited.

† See JOURNAL, April 14, 1960

FIG. 1 (*left*).—*Geoffrey Clarke, the sculptor, in his home-made foundry;* FIG. 2 (*below, left*)—*Building up the pattern for the window, using shapes cut from "Styrocell" expanded polystyrene.* FIG. 3—*The finished "window" in Ipswich technical college.*

New Foundry Technique

volatilizes, its place in the mould being taken by the aluminium which then solidifies into the required shape. Using this method Clarke claims he can obtain much more intricate shapes than with conventional moulding techniques.

A former student of the Royal College of Art, Clarke's early work gained recognition at the 1951 Festival of Britain and he has since won commissions from top architects like Sir Hugh Casson and Sir Basil Spence. Three windows in the nave of the new Coventry Cathedral are his work.

Industrial Films

The following new films are now available on loan from the Central Film Library, Government Building, Bromyard Avenue, Acton, London, W.3, free of charge or on the terms stated:—

A Case for Shiftwork? (UK 1647), (three reels, running time 31 min., hiring charge 15s.). The film deals with the advantages and problems of shiftwork and stresses that the system adopted should be suited not only to the machines, but to the people who work them. The investigation takes place in a textile factory and emphasis is laid on the need for early and full consultation between management and trade unions. (Film produced by the British Productivity Council.)

The Man in the Middle (UK 1648), (three reels, running time 27 min., hiring charge 15s.). This film, made by the British Productivity Council, portrays the story of a foreman's difficulties in his position between management and men, and in his relations to specialist departments.

Accent on Mechanical Handling (UK 2186), (four reels, running time 38 min., free of charge). A colour film which demonstrates various types of mechanical-handling equipment and based upon sequences taken at recent mechanical-handling exhibitions. (This is a new version of UK 2033 which continues temporarily in distribution).

Handling Loose Materials (UK 2187), (three reels, running time 32 min., free of charge). The film shows the handling of granular and powdery materials in the loose state. Part one (10 min.) demonstrates mechanical handling methods, including closed and "zipper" conveyors, bucket elevators, charging and discharging equipment, and part two (22 min.) deals with pneumatic systems. (Film issued by Unilever.)

Clean Heat-treatment of Metals (UK 2189), (three reels, running time 33 min., free of charge). A colour film made by the North Thames Gas Board showing the need for deep, clean and controlled heat for the working and subsequent stress-relieving of metals, and how this is provided in gas-operated furnaces. Control of temperature and atmosphere, methods of cooling and quenching, etc., are also dealt with.

Vulcan Vigilant (UK 2190), (two reels, running time 20 min., free of charge). This film, produced by Vulcan Boiler and General Insurance, gives examples of the work carried out by the company's surveyors in statutory routine inspections of boilers, pressure vessels, motor and lifting plant, and also in the testing of specifications and performance of new equipment before it is put into service.

A Question of Aptitude (V 544), (one reel, running time 12 min., hiring charge 5s.). This is a German film with English commentary and made by Kulturfilm-Institut, and details aptitude tests for the selection of industrial apprentices. Various psychological and practical tests are shown as carried out at the sponsor's apprentice school in Frankfurt.

Fire Prevention—Know Your Fire Hazards (V 548), (two reels, running time 20 min., hiring charge 20s.). This is a colour film and deals with fire hazards in the workshop and in the home and was made by the US Navy. It deals with the behaviour of vapours from inflammable liquids and the risk of ignition through contact with open flame or spark, through static electricity or spontaneous combustion.

Die Casting: How Else Would you Make it? (V 559), (four reels, running time 35 min., free of charge). This film, in colour, has been produced by the American Zinc Institute and shows die-casting as a means to the mass production of parts in irregular and complicated shapes. It shows, in detail, the die-casting process in both hot- and cold-chamber machines, gives examples of subsequent finishing processes, and demonstrates the range and versatility of the process.

Italian Foundry Congress

The sixth Foundry Congress, promoted by *Assofond*, will take place this year in Turin from October 1 to 4 and will have as its theme "Foundry productivity increment and its technical and economic adjustment to the exigencies of the engineering industry."

The programme foresees official inauguration of the Congress at Teatro Nuovo on October 1. Prof. Cirilli, director of the Institute of General and Applied Chemistry and Metallurgy of the Turin Polytechnic School, will give an opening address on the history of foundry pig-iron production, followed by Dr. Mortara who will speak about foundry business prospects. In the afternoon, the programme includes a visit to the "International Salon of Technics and the First European Salon of Metallurgy and Foundry." On October 2 and 3 Congress activity will continue in the lecture room of Teatro Nuovo. On the latter day is scheduled a visit to the foundry and forge sections of Fiat, Nebiolo and Fonderia Giovanni Mandelli.

The Congress will be four sections, two of which will be allocated to a meeting with spread over machine manufacturers and designers, and the remainder to technical and economic problems of the foundry industry. At the first session, under the chairmanship of Prof. Dupuis, papers on the following subjects will be presented and discussed: "Castings as Substitutes for Forgings in the Automobile Industry". "Cast-iron Crankshafts"; "Non-destructive Tests on Castings"; and "Technical Relations between Foundrymen and Machine Manufacturers."

At the second session, to be held in the afternoon of October 2 and with Mr. Rossi Cairo (general manager of Loro & Parisini) in the chair, the following memoirs are scheduled for presentation and discussion: "Treatment of Iron Castings"; "Observations on Modern Machining Methods for Castings"; "Further Considerations on Tolerances in Castings"; "Excess Metal"; and "Jigging Points."

The sessions on technical and economic problems of the industry will be held on October 3. At this, "Ironfoundry Costing"; "Foundry Planning"; "Operational Research in the Foundry"; Method for Determining the Desirability of Installing Foundry Plant and Machinery"; "Fight against Dust and Noise in Iron Foundries", and "Contribution to the Study of Copper in Cast Iron," will be among the subjects presented. The session will conclude with a discussion on the theme "Novelties in the Foundry Industry."

Equipment & Supplies

Portable Hardness Tester

Metallurgical Services, Reliant Works, Betchworth, Surrey, are now handling the American-made "Newage" portable hardness-tester. To make a test, the unit is placed on the part of the specimen to be tested, and the hand-grips pressed towards the specimen, and the dial read. It is claimed that no skill is required and no conversion charts or calculations necessary. The instrument is available in individual

"Newage" portable hardness - tester, used by applying hand pressure at the side pieces (Metalllurgical Services).

ranges corresponding to Rockwell "A," "B," or "C," Brinell 50 to 260 or 100 to 440 ranges. All models are supplied complete with diamond penetrator, test-piece and wooden case.

Thermocouples

Thermocouples for detecting temperatures in industry and research of up to 4,200 deg. F. (2,315 deg. C.) are to be marketed by Honeywell Controls, Limited, Greenford, Middlesex. Materials used are combinations of tungsten, rhenium, rhodium, molybdenum, iridium and platinum, to give a number of working ranges, and types are available for use in both oxidizing and reducing environments.

The maximum of 2,315 deg. C. is obtained by using tungsten-tungsten/26 per cent. rhenium. The thermo-electric output of such a thermocouple is nearly three times as great as that of a tungsten-rhenium thermocouple, the temperature/e.m.f. curve is more linear in the 1,095-2,190 deg. C. range and improved uniformity of wire is obtained because the 26 per cent. alloy is more homogeneous, it is claimed. Another of the new thermocouples uses platinum/30 per cent. rhodium-platinum/6 per cent. rhodium, designed for continuous use up to 1,500 deg. C. and intermittent service up to 1,800 deg. C. It is stated that the new alloy type does not suffer excessive grain-growth, vaporization, contamination and other disadvantages of existing platinum-rhodium thermocouples.

Control Information Relaying

A "Productograph," for which Adrema, Limited, Telford Way, London, W.3, now have the marketing and assembly rights for Great Britain from Siemens-Halske, Germany, is claimed to be one of the most advanced systems for the recording and writing of full production data from individual operating units in a production process. Essentially, information is gained *via* transducers located on, for example, individual moulding machines, mixing machinery, other process plant, or conveyor systems, continuous production processes and flow meters, etc. The transducer converts the information into an electrical signal, which is then fed along wires to the central "Productograph" control-centre.

The control centre, which may deal with 20, 40, 60, 100, or 200, transducer sources of information, consists of several units, namely a *linear counter* for the visual production recording of each unit in the workshop or factory; *electrical counters*, which record the quantity of product produced and the production time consumed; an *integrator* (for group control), which indicates, by a light system, the productive and idle times of plant units; a *machine diagram recorder*, which records continuously the production cycles of up to 20 machines per recording unit (on 20 double tracks on inkless, waxed paper); a *high-speed recorder* for extended work analysis of any particular unit; a *duplex and light-signalling installation* for control lights at plant stations and for two-way communication between the operator and control, and a *tape-recording system* for the recording of instructions and advice, explanations, etc., from night-shift operators during periods when the "Productograph" may be left unattended.

The "Productograph" system, it is claimed, enables operations to be supervised simultaneously and for data to be obtained and recorded instantaneously, eliminating the necessity for teams of paper-work staff to tour constantly the workshop or plant.

Acoustic Service

Marley Tile Company, Limited, from Riverhead, Sevenoaks, announce the introduction of an acoustic service for industry (see Fig. 1). Free of charge, the firm advise on technical aspects of sound suppression and insulation in respect of applications of acoustic tiles, pyramids, sound-deadening board, thermal insulation and wood-wool slabs. The firm's acoustic tile range includes Marleytone, a 12 by 12 by ¾-in. mineral fibre sound-control tile with fissured surface claimed

FIG. 1.—*Member of the staff of the Marley Acoustic Division checking sound intensity with the aid of a sound-level indicator.*

FIG. 2.—*Surface-hardness tester of Metal Porcelains, Limited, in use at the company's laboratory.*

to be incombustible and to eliminate up to 75 per cent. of normal noises transmitted to a ceiling. Two other tiles offered are Decortone (a 16 by 16 by ⅛-in. vinyl plastic tile containing sound-absorbing slabs of mineral wool), and Finetone (a 12 by 12 by ½-in. wood-fibre tile).

Castors for Stillages

Castors suitable for fitting to stillages to make them manually portable are now being supplied by Flexello Castors & Wheels, Limited, Slough, Bucks. They are constructed of heavy-gauge pressed steel with cast-iron wheels and nickel/chrome/steel ball-bearing swivels, and when bolted or welded to the underside of the stillage, give sufficient clearance below the legs to allow of normal handling and stacking operations. The castors should be secured to a flat base, and all that is normally necessary is the addition at the base of two sections of angle-iron parallel with the side-members of the stillage frame. Apart from providing a firm fixture, such angle sections also protect the castors from the forks of a lifting truck.

Surface-hardness Tester for Enamels, etc.

Now that domestic and industrial finishes are becoming increasingly important, the way a product will wear, travel and fulfil its function needs to be known. To meet this need Metal Porcelains, Limited, Cornwall Road, Smethwick 40, have developed a new machine which will test and record with precision the comparative scratch-resistance properties or surface hardness of a wide range of vitreous and other enamels, glass, plastics, metal, coated surfaces, etc. In Fig. 2 the machine is seen in use in the company's laboratory for testing the scratch-resistance of the porcelain enamel they manufacture.

The machine is precision made in chrome and a metallic "hammer" finish, the sample to be tested being merely clamped on to the traverse table. A suitably tipped scribber, it is stated, will give a reproducible impression on a large number of samples.

In use, a pan on the scribber arm is loaded with "standard" balance weights (Fig. 2), the scribber is lowered on to the sample and the traverse of the table is set in motion by a push-button switch operating a motorized gear unit. The table is stopped by a limit-switch at the end of its traverse, the scratch having been made; then the scribber is lifted and the table is returned by pressing the clutch button. The sample is next moved by a graduated handwheel to give subsequent scratches parallel to the first, and the load on the pan can be suitably adjusted to give a variation in scratch. A counter is incorporated in the body of the machine to record the number of tests made. The machine is 16-in. wide, 12-in. deep, 11-in. high, and weighs 31 lb.

Feed-controller

An automatic feed-controller, developed for use in pulverizing, grinding and milling (as, for example, in foundry sand treatment), is announced by Lancashire Dynamo Electronic Products, Limited, Rugeley, Staffs. In operation the loading of the mill-motor is measured by means of a current transformer and the controller provides stepless adjustment of the speed of the input feed motor, so maintaining the mill loading desired. An overfeed protection system is also incorporated. The equipment is manufactured in its standard form in ratings of from 0.5 to 4 h.p., the smaller models being suitable for wall mounting.

Nickel/Silicon/Copper Alloy: Johnson Matthey & Company, Limited, announce the development of Mallory 53, a nickel/silicon/copper alloy to fulfil the need for a spring material with mechanical properties at least equal to those of the conventional phosphor-bronzes and brasses, but with appreciably higher electrical conductivity—40/45 per cent. I.A.C.S. A data sheet, 1300:332, giving details of the characteristics of the alloy and the forms in which it is supplied, is available on request to the company's head office at 73-83 Hatton Garden, London, E.C.1. Another data sheet issued by the company describes their cobalt/platinum permanent-magnet alloy, Platenax II.

Flow Indicator: A 1-in. size Arkon ball-type flow indicator is now available from Walker Crosweller & Company, Limited, Cheltenham—an addition to their ½-in. range. The body of the indicator is made of gunmetal and the flow is indicated by the movement of a white nylon ball under a toughened glass dome. The starting flow on liquid is ¼ gall. per min. and 2 cu. ft. per min. on gas; if the flow stops, the ball drops out of sight. The manufacturers state that the larger-size indicator has been introduced following the demand for a positive way of showing whether or not flow is taking place in pipelines.

Differential Pressure-gauge: A new differential pressure-gauge is described in *Bulletin* E.10, issued by Pall Corporation, Glen Cove, New York. The *Bulletin* contains specifications, drawings and ordering information. The gauge it describes is a leak-proof model operating by a magnetic coupling. It is designed for indicating up to 60 lb. per sq. in. in systems up to 3,000 lb. per sq. in.

Drill: IFM (Developments), Limited, Midland Bank Chambers, Lye, Stourbridge, announce that they have recently been appointed British agents for the "Jager" portable magnetic drill press.

"Electricity in the Foundry"

"Electricity in the Foundry Industry" is the title of a two-day conference, organized by the Midlands Electricity Board, to be held at Wulfrun Hall, Wolverhampton, on October 10 and 11. It is to be opened by Major C. R. Dibben, C.B.E., chairman of the Board, at 9.15 a.m. Two lectures follow, one on arc furnaces by Dr. A. G. Robiette, and a second on induction furnaces by Mr. R. O. L. Clarke. The chair will be taken by Mr. D. A. Richards. In the afternoon starting at 2.15 p.m., Mr. A. E. Savage will talk on the industrial electricity tariff, Mr. P. R. Harrison presiding.

The Wednesday morning sessions start at 9.30 a.m. with a lecture on malleabilizing furnaces by Mr. T. R. Brown, with Mr. H. J. Hall in the chair. The second talk on materials handling and automation is by Mr. L. Landon Goodman, with Mr. A. A. Timmins presiding. The final afternoon session is to be addressed by Miss M. Brand, H.M. Superintending Inspector of Factories, who will deal with "Amenities in the Foundry." Mr. J. Bamford is to preside. Mr. G. S. Buckingham, chief engineer of the Midlands Electricity Board, will close the conference. A registration fee of £2 will include a copy of each paper, morning coffee, luncheon and tea each day. Details are available from the area manager, MEB, 83, Darlington Street, Wolverhampton.

Designing for Productivity

An international survey of the management and function of design departments and drawing offices in the mechanical and electrical engineering industries is being carried out simultaneously for OEEC in nine countries, Austria, Belgium, France, West Germany, Italy, the Netherlands, Portugual, Sweden and the United Kingdom.

The British report is being prepared—at the request of the Board of Trade—by the British Institute of Management in conjunction with the British Productivity Council. The results will be forwarded to Paris where they will be studied and analysed by a team of specialists that will include the BIM representative, Mr. B. H. Dyson, formerly director and general manager for overseas production of Hoover, Limited.

Edward Matthews' New Offices

New office premises which were opened on Saturday last at the foundry of Edward Matthews, Limited, Bilston, Staffs, will make it possible for this wellknown firm of ironfounders to use space occupied by the older offices for production. The opening ceremony and the luncheon that followed were presided over by the company chairman, Mr. P. Rice. The offices which provide 4,000 sq. ft. of accommodation in a two-storey block have been built along the foundry frontage. Behind the offices a new patternstore has been erected which will increase the storage space available by 3,000 sq. ft. This is an important development as so much of the company's work is of a jobbing nature and the number of patterns in regular use is large. Generous use is made of glass in the new building, which is heated by under-floor units.

The foundry, which employs about 250 people, was founded by Mr. Edward Matthews in 1917. Specialists in high quality work, the firm supplies castings to the engineering industry particularly the electrical engineering, machine-tools, and printing trades. The castings vary in weight from 1 oz. to 8 cwt., and because of the specialized nature of the work great attention is paid to the training of apprentices to replace retiring skilled men, many of whom have had long periods of service with the company.

New Industrial Estate in Glasgow

About 10,000 new jobs will be provided when "Dixon's Blazes," site of the former Dixon's Iron Works, Glasgow, is developed as an industrial estate. The 35-acre site will accommodate about 20 factories of varying sizes. Negotiations are in hand with six companies including engineers. Mr. Harold McCue, chairman of Taylor Woodrow Industrial Estates, Limited, who are developing the site, said that the potential value of the building work is £3,000,000. Total investment including plant and machinery is between £6,000,000 and £7,000,000.

The factories to be built range from 5,000 to 250,000 sq. ft. and it is hoped to interest American industrialists planning a move to Britain. Inquiries have also been received from large firms in Scotland and England.

Consolidating Export Relationships

As part of their export drive, Locker Industries, Limited, recently invited a party of Swedish engineers and executives to tour a number of factories where the company's equipment is operating and also to inspect their factories in Warrington. In the accompanying photograph, Mr. J. Dutton, a director, is seen welcoming the leader of the Swedish delegation at Ringway Airport. Of particular interest to the visitors were foundries, foundry plant and handling equipment. The party returned to Sweden on September 20.

Locker Industries' exports are handled either from the Warrington head office or from branch factories in Australia and South Africa.

Translation Services

From amongst the most recently published lists of translations available from the Iron & Steel Institute (4, Grosvenor Gardens, London, S.W.1), the following have been selected as being of interest to founders. The price quoted is that for single copies, postage extra, there being reductions for quantities ordered. Readers writing for translations, or for further information, should mention this JOURNAL when doing so.

BISI 2026-2028, 2035 FOUR PAPERS PRESENTED AT THE CENTENARY CELEBRATIONS OF THE VEREIN DEUTSCHER EISENHUTTENLEUTE, DUSSELDORF, 3-4 November, 1960 (*JISI* abstr. 1961, July 337a). *Stahl Eisen*, 1960, *80*, Dec. 8. (£6 each, or £20 for the set of four.)

BISI 2116 WELDING GREY AND NODULAR CAST IRONS. (From German.) Puschner, M., & G. Suchanek. *Technica*, 1960, *9*, Oct. 7, 1295-1298. (£4.)

BISI 2363 NEW DUST-MEASURING METHOD. (From German.) Winkel, A. *Staub*, 1959, *19*, July 1, 253-255. (£2 5s.) The article reports on a new dust-measuring method with soluble Mikrosorban-filters. Compared with the hitherto customary methods, this measuring method has a great advantage, inasmuch as it permits the precipitation of large quantities of dust without any material pressure rise on the filters and makes them easily accessible for an analysis.

Translations in course of preparation include:—

BISI 2374 DETERMINATION OF CARBON IN STEELS AND FERRO-ALLOYS WITH LOW CARBON CONTENTS. (From French.) Dézirat, R. *Rev. Mét.*, 1960, *57*, Dec., 1125-1132. (Included in response to requests—List B 62.)

BISI 2375 DETERMINATION OF OXYGEN IN STEELS BY MELTING IN REDUCING CONDITIONS UNDER ARGON. (From French.) Hanin, M. *Ibid.*, 1960, *57*, Dec., 1133-1141.

BISI 2401 EXPERIMENTS MADE WITH THE HYDRAULIC CONVEYANCE OF SLAG, SAND AND OTHER SOLIDS IN IRON AND STEEL WORKS. (From German.) Altpeter, W. *Stahl Eisen.*, 1961, *81*, July 20, 1006-1014.

BISI 2412 METHODS FOR FREEING GAS FROM DUST. (From German.) Weber, E., & W. Bruchhäuser. *Aufbereitungs-Technik*, 1960, Oct., 429-435, I; 1960, Dec., 518-527, II; 1961, June, 241-249, III.

Other People's Translations

The initials DSIR, etc., stand for the organization to which enquiries for the following translations should be made, quoting the reference numbers. Addresses are given at the end of the list.

DSIR M.2363 AUTOMATIC DISCARD CONTROL OF USED SAND FROM SHAKEOUT TO A BELT CONVEYOR. Adaev, P. D. et al. *Lit. Proizv.*, 1959 (12), 37.

MT 202 AUTOMATIC CONTROL OF THE RATE OF INCLINATION OF THE LADLE DURING THE POURING OF PIG-IRON. Beloshabekii, Y. I., & A. L. Shteiner. *Metallurg*, 1961, *6*, (5), 10-12.

OTS 61-11543 CASTING WORK (SELECTED TRANSLATIONS). Chu Kung. *Chu Kung* (Chinese People's Republic) 1959, No. 9, 1, 10, 27, 31, 36, 42; No. 10, 1-4, 7-8, 11, 20, 28, 50, 53; No. 11, 2, 18, 21, 24, 30, 33; No. 12, 6-8, 23-24, 29, 48. ($2.25.)

MT 206 PRESERVATION OF OLD TYPES OF IRON. Daeves, K. *Die Naturwissenschaften*, 1935, *23*, 653-6. (£2 2s.)

SLA 61-10642 INFLUENCE OF BLAST RATE, COKE SIZE AND THE PROPORTION OF COKE BETWEEN CHARGES ON THE FUNCTIONING OF THE CUPOLA. Danis, F., & M. Decrop. *Fonderie* (France), 1958, (143), 125-232. (mi $1.80, ph $1.80.)

ATS-38N49G DIN (GERMAN INDUSTRIAL STANDARD) 51, 790: PROCEDURE FOR THE DETERMINATION OF VANADIUM. *Erdöl u. Kohle* (W. Germany), 1960, *13*, (10), 787-88. ($7.00.)

DSIR M.2360 STRENGTH OF A MOULDING MIXTURE WITH S.B. BINDER. Egorkina, N. D. *Lit. Proizv.*, 1959, (12), 31-32.

MT 192 LOSS OF ALUMINIUM THROUGH COMBUSTION DURING THE DEOXIDATION OF UNALLOYED STEEL IN AN ARC FURNACE. Fremunt, P., & K. Stransky. *Slévárenství*, 1961, *9*, (4), 126-131. (£7 15s.)

DSIR M.2356 SUPERHEATING OF IRON IN THE CUPOLA. Kaibichev, A. V., & V. P. Chernobtovkin. *Lit. Proizv.*, 1959, (12), 22-24.

MT 204 TESTING MATERIAL AT HIGH LOADING SPEEDS. Kermes, J. *Strojírenství*, 1961, *11*, (6), 449-53.

DSIR M. 2363 PRODUCTION OF IRON CASTINGS OF HIGH QUALITY. Khedosek, I. P. *Lit. Proizv.*, 1959, (12), 38.

NCB A.2004 AN ELECTRONICALLY-CONTROLLED DEVICE FOR CONTINUOUS MEASUREMENT OF BUNKER CONTENTS. Merx, F. & A. Kihm. *Glückauf*, 1961, *97*, (5), March 1, 256-260.

MT 171 VACUUM CASTING OF STEEL. Motloch, Z. *Hutnické Listy*, 1958, *13*, (11), 1037-1050. (£8).

LC SLA 61-19429 US AEC NP-tr-587 OSCILLOGRAPHIC METHOD OF MEASURING THE RATE OF MOTION OF A METAL IN A CAST MOULD. Orlova, T. I. *Lit. Proizv.*, (USSR), 1954, (7), 25-27. (mi $1.80, ph $1.80, *LC, SLA.*)

DSIR M.2363 EXPERIENCE WITH INDUCTION FURNACES. Panin, V. V. *Lit. Proizv.*, 1959, (12), 40.

DSIR M.2363 EXPERIENCE WITH A MOULDING COMPOUND ON A LIGNITE BASE. (MONTAN WAX). Pavlov, O. P., et al. *Lit. Proizv.*, 1959, (12), 39.

DSIR M.2363 MELTING MAGNESIUM-ALLOY IN BASIC CRUCIBLES. Perov, A. P., & I. S. Pryanishnikov. *Lit. Proizv.*, 1959, (12), 40.

DSIR M.2363 A SECTIONAL CASTING BOX. Rabinovich, B. V. *Lit. Proizv.*, 1959, (12), 39.

SLA 61-10580 STUDY OF THE COMBUSTION OF COKE IN THE CUPOLA. Ulmer, G. *Fonderie* (France), 1956, (125), 232-37. (mi $1.80, ph $1.80.)

DSIR M.2361 WETTING OF MOULDING MATERIALS BY THE MOLTEN ALLOY. Valisovskii, I. V. *Lit. Proizv.*, 1959, (12), 32-35.

Symbols for Sources of Translations

US AEC: Office of Technical Services, Department of Commerce, Washington, 25, D.C., USA. ATS: Associated Technical Services, Inc., P.O. Box 271, East Orange, New Jersey, USA. DSIR: Department of Scientific and Industrial Research, 20, Chester Terrace, London, N.W.1. LC: Photoduplication Service, Library of Congress, Washington, 25, D.C., USA. MT: M. de O. Tollemache, The Old Rectory, Lewknor, Oxon. NCB: National Coal Board, Hobart House, Grosvenor Place, London, S.W.1. OTS: Office of Technical Services, Department of Commerce, Washington, 25, D.C., USA. SLA: SLA Translation Center, The John Crerar Library, 86, East Randolph Street, Chicago 1, Illinois, USA.

Matthew Murray School

The Matthew Murray Comprehensive School, which opened at Holbeck, Leeds, on September 5, commemorates a man who has been called the Father of Leeds Engineering. He was the first man to make a practicable railway using steam locomotives. Matthew Murray was born in Newcastle and in 1789, at the age of 24, walked from Stockton to Leeds and began work with John Marshall, a linen manufacturer. He was a wheelwright by trade and set about improving his employer's machinery. He developed a hackling machine for combing and grading linen fibres, with a design which won a Society of Arts gold medal. He set up his own engineering business six years later. He had two partners and their first premises were in Mill Green, Holbeck. In 1801 they moved to Water Lane and built the famous Round Foundry. The firm advanced from the making of flax-processing and linen-manufacturing machinery to designing engines and, eventually, steam locomotives which could haul over 100 tons of coal at more than three miles an hour were produced. Machine-tools for the developing engineering industry were also designed, and in 1814 a planing machine was brought out. Matthew Murray died in 1826. A plaque has been provided for the school by the Leeds Association of Engineers to commemorate Murray.

A NEW TRAINING SCHOOL built and equipped at a cost of more than £250,000 at the Pressed Steel Company, Limited, Cowley, Oxford, was opened on September 20, by Mr. W. J. Carron, president of the Amalgamated Engineering Union. It is a five-storey building and is intended not only for the training of craft and student apprentices but also to accommodate courses for supervisory and executive staff, and for university graduates entering industry.

American Letter

Flash Welding of Cast Iron

Flash welding of cast iron and heat-resistant high-chromium nickel alloys were discussed at a recent meeting of the American Welding Society in a paper entitled "Solution Adopted in Some Difficult Applications of Welding," by Mr. Evert Bylin, technical secretary of the Swedish Welding Commission, Stockholm. The paper gave details of an investigation conducted on the flash welding of cast iron as employed for joining flanges to centrifugal-cast pipes and as applied to creep- and heat-resisting high-chromium nickel alloys with the basic composition of Cr 20, Co 0 to 20, Ni 70 to 50, Fe 5, Al 5 per cent., plus traces of Ti and Si, as used in jet engines. The welding was performed in a machine with automatically-controlled motor-operated upsetting, whereby the upsetting speed was considerably lower than that used in hydraulically-operated machines.

Methods Applied

The Author said that flash welding as practised in America generally differed from the way it was executed in Europe. In America, welding without preheating or with manually-governed preheating was very common. In Europe, on the other hand, welding with automatic preheating was the prevalent practice and this latter method was now adopted in Sweden.

Briefly, the *modus operandi* of flash welding is that the contact surfaces are short circuited through multiple surface-irregularities which develop myriads of craters caused by melting at the contact points, then creating new points consecutively, and repeating the effect at very short intervals. (It had been found that a cast-iron tube of 2,300-mm. weld-section would make a most suitable weld in 40 to 50 sec. at a secondary voltage of 8 to 6 volts. The speed was so fast that it had the appearance of a continuous process.) During the flashing, the components to be joined had to be advanced at a constant accelerating speed, known as upsetting, the objective of which was to stop the flashing; to bring the faying surfaces together; squeeze out molten material; deform the uneven faying surfaces so that a close contact was obtained over the entire surface—in addition to where craters had been formed during flashing—and to produce a pressure such that tensile stresses could not occur when cold and where components shrunk during cooling. During upsetting, deformation of hot metal occurred. In general, quite heavy deformation was no problem, as most materials could endure this without cracking. However, for some materials, a certain amount of care must be taken. This applied particularly to cast iron (which could stand only insignificant elongation) and to materials prone to segregations where the segregation streaks by heavy upsetting might be oriented across the longitudinal direction in such a way that they caused a notch-effect. Sometimes, slag inclusions originally present in random orientation might flatten out and be finely dispersed in the weld, causing a poor bonding.

From the foregoing, the lecturer said that it was evident that the actual problem was one of accurate control of the entire welding process. This could be accomplished by using a system with automatically motor-operated platen, whereby it was possible to obtain good control of all stages in the welding operation. The most important difference compared with hydraulic operation was that the upsetting was made at a rather low speed and that the platen travel was braked electrically so that an exact setting of the upset travel was possible without transmitting the inertia of the platen to the work-piece or to mechanical stops.

Results of Investigation

The investigations showed that with motor-operated flash-welding units, very good results could be obtained in welding high-chromium nickel with an upsetting pressure considerably lower than that recommended for other types of flash welders. In spite of the considerably lower upsetting pressure, other influencing factors would not be more difficult to assess. However, due consideration must be given to the extremely low heat-conductivity and high electric-resistance of the material. The investigation described in the lecture seemed to prove that close control of temperature conditions and upset travel improved the flash welding of cast iron and heat-resistant high-chromium nickel alloys. If in the case of cast iron, the upset was made so as to maintain a certain plasticity in the weld zone immediately after completion, the risk of destroying the structure in the transition zone was eliminated, and as a consequence, there was no risk of cracks or cold upset. With high-chromium nickel alloys, overheating and superficial cracks seemed well under control when using flash welding. The importance of close control of upset travel and upset pressure was stressed and the experience described in the lecture proved that short upset-travel, low upsetting pressure and moderate upsetting speed were also advantageous for steel strip, which presented difficulties similar to those posed by cast iron and high-chromium nickel alloys.

Facts about US Foundries

A study of the American foundry industry, both ferrous and non-ferrous, was carried out recently by the Federal Reserve Bank of Cleveland, Ohio, US. Pertinent facts from this study include the following: US foundries are estimated to produce nearly 4,000 different kinds of castings for use in more than 500 different industries. Three-quarters of all foundry production in 1958 was turned out by "independent" foundries (those producing castings for buyers in the open market on a contract basis) in contrast with "captive" or "tied" foundries, which are integrated with other manufacturing industries. Grey-iron foundries make up 45 per cent. of the whole industry on a value added basis and 46 per cent. on an employment basis. Non-ferrous foundries comprise 26 per cent. of the whole industry both on a value added and employment basis, and US steel foundries accounted for 20 per cent. of total foundry employment and 22 per cent. of total value added by this industry during 1958. Malleable-iron foundries, accounting for 8 per cent. of total employment and 7 per cent. of value added, comprise the smallest segment of the US foundry industry. The article included tables showing the uses made of the different types of castings and the markets for them. For example, the survey states that more than half the malleable-iron castings and more than half of the aluminium and aluminium-alloy castings were destined for automobile and truck applications.

Missouri Valley Conference

The 1961 Missouri Valley Regional Conference of the American Foundrymen's Society took place on September 21 and 22 at the Missouri School of Mines, Rolla, Missouri. Amongst the papers presented during technical sessions on the Thursday were:—

"New Developments in Foundry Practices," by J. A. Rassenfoss (American Steel Foundries); "Desulphurization of Steel," by B. Gray (Air Reduction Company);

American Letter

"S.-g. Iron," by J. Green (Sorbo-Mat Process Engineers); "High-quality Aluminium Castings," by A. B. DeRoss (Kaiser Aluminium & Chemical Company); "Refractories for the Foundry Industry," by R. Pardee (Kaiser Aluminium & Chemical Company); "Marketing of Engineering Irons," by H. Randall (International Nickel Company), and "ABC of Moulding-sand Practices," by Clyde A. Sanders (American Colloid Company).

The Friday sessions included the following papers:—"New Developments in Core and Mould Making for the Steel Foundry," by V. M. Rowell (Archer-Daniels-Midland Company); "New Core and Mould Processes for the Iron Foundry," by A. Dorfmueller Jr. (Archer-Daniels-Midland Company); "Control of Quality in the Brass Foundry," by F. L. Riddell (H. Kramer & Company); "Sand for Moulding and Coremaking," by T. W. Seaton (American Silica Sand Company); "Gating and Feeding," by H. Otey Meriwether Jr. (Lynchburg Foundry Company), and "New Developments in Core Practice," by R. Jacoby (St. Louis Coke & Foundry Supply Company). In addition to the papers, an educational shop-course and demonstrations on non-destructive testing were arranged.

US Automobile Industry

It is expected that the production of automobiles in the US will fall to the lowest output so far this year as the industry is switching over its assembly lines from old to new models, and output will be less than a third a year ago (see Table below).

	Jan. 1, 1960, to July 1, 1960	Jan. 1, 1961, to July 29, 1961
Total cars, US	4,248,134	3,131,891
Total trucks, US	805,146	663,338
Total cars and trucks, Canada ..	278,240	243,878
Total units, US and Canada	5,331,520	4,039,107

Latest forecasts place the total production for the year at 5,600,000 (compared with 6,696,108 a year ago), but other American sources believe this estimate unduly optimistic and that the figure will be closer to the 5,000,000 mark.

Exports

Exports of cars from the US, which once amounted to almost 10 per cent. of production at their peak, have so declined that in 1959, factory sales to foreign markets totalled only 2.1 per cent. of the domestic output. American automobile manufacturers are undertaking to increase their share of the foreign car market by building more cars overseas, as operations abroad will obviate foreign-exchange difficulties, reduce costs and improve their competitive position in world markets. The expansion of operations abroad by American companies will mean keener competition for foreign car-manufacturers.

AT THE REQUEST OF THE MINISTER OF LABOUR, the Industrial and Staff Canteen Undertakings Wages Council met on September 11 to reconsider the proposals made in Notice L.S.C. 34, regarding wage rates and hours. The Council concluded that the settlement, reached by agreement on June 9, was a commitment already entered into. Also the proposed changes were not considered to be inflationary as they apply to the existing statutory minima, and that should implementation of the agreed decision be further delayed, the confidence and goodwill between those concerned would inevitably suffer.

Law Cases

No Warning of Crane's Approach

At West Bromwich Stipendiary Magistrates' Court, Dartmouth Auto Castings, Limited, one of the Birmid Industries group, was fined £40 on a charge of committing a breach of the Factories Act. The prosecution followed an accident in which an employee was killed when struck by an overhead crane. Mr. W. E. J. Greville, H.M. Factory Inspector, stating the case against the company, where a 35-year-old maintenance worker, George Bernard Wilcox, was fatally injured on May 18, submitted that the firm had not taken effective measures to warn Wilcox of the overhead crane's approach when he was working on the top of a sand hopper in the foundry. The crane had been called to move boxes from one part of the foundry to another, by the foreman, William Charles Dolman. He and the crane driver, Lashkar Singh, told the court that they did not know anyone else was in the shop at the time. The company pleading "Not Guilty" submitted that the required precautions had been taken, but the Acting Stipendiary, Mr. R. E. Chapman, said that a *prima facie* case had been established in that both the person who instructed the crane to be moved and its driver had said that they gave no warning. This, he said, shifted the onus on the defence to establish that effective measures were taken to warn Wilcox.

Water Pollution—Firm Fined

Stanton Ironworks, Company, Limited, near Nottingham, were fined £15 with £70 costs at Ilkeston Magistrates' Court after pleading "Not Guilty" to causing liquid to poison canal water. Mr. Reginald Martin, an inspector of the Pollution Department of the Trent River Board, said that on May 9 he saw scores of fish leaping out of the water of the Erewash Canal, near Ilkeston. They were in obvious distress—150 dead fish were found. Samples of the water taken on the spot—just opposite Stanton pig-iron plant—were found to contain traces of cyanide. Samples taken a little upstream were clear of the poison. Mr. Edwin Summers, iron production manager at the works, said that the pollution was accidental. A dam had been built to divert effluent from the works into a new drain, but it must have overflowed because of a temporary blockage. An investigation had failed to disclose the reason but steps were being taken to make sure that a similar failure did not happen again.

Hoists and Lifts

In June 1960, the British Employers Corporation sent to the Ministry of Labour some general observations and comments on a draft Hoists Exemption Order which the Ministry had prepared. The intention of the Order was to re-define and increase the classes of lifts and hoists entitled to exemption from various of the provisions of s. 22 of the Factories Act, 1937.

In the light of these observations and those received from other interested organizations the Ministry has prepared a revised draft of the Order. This appears to meet most of the BEC's comments.

In addition the BEC urged that, in view of the wide range of lifting apparatus used in industry and the difficulty of determining into what category (if any) the apparatus fell, an explanatory leaflet on the new Order would be of great assistance. The Ministry acknowledges the problem and is examining the possibility of preparing a leaflet.

News in Brief

IT IS ANNOUNCED by the Butterley Company, Limited, that the sale of the minority interest in Air Products, Limited, to the parent company, Air Products and Chemicals Incorporated, of America, has now been effected.

THE COVENTRY FIRM of Lea Francis Cars, Limited, began production last week of a medium-size tractor for both agricultural and industrial use. Initially it is planned to produce 40 a week with the production planned to reach 20 per day.

A $550,000 ORDER for British motor-cycles—enough to keep the Birmingham factory working to capacity for two months—has been taken by Mr. Alec Skinner, managing director of Norton Motors, Limited, during a three-day visit to New York.

THE DISUSED WALLACE FOUNDRY BUILDINGS in Dundee have been acquired by Millbrun Motors, Limited, of Glasgow, for use as a maintenance, repair and manufacturing depot, on light-metal bodywork and articulated trailer construction.

AT THIS year's Motor Show to be held at Earl's Court from October 18 to 26, the exhibits of the Sheepbridge Engineering Group (stands 268 and 269) will include a wide range of centrifugally cast iron, and s.-g. iron components together with examples of continuously-cast iron and phosphor-bronze bar.

A STEEL MARINE CASTING made at Firminy, near St. Etienne, has left for Malmo in Sweden. It weighed 87 *tonnes* and was 23-ft. long by 18-ft. wide and 8-ft. high. Even though exothermic feeder heads were used it needed 120 *tonnes* of liquid steel for its making and 200 *tonnes* of cement sand for making the mould.

THE NEW £1,500,000 NAPIER TECHNICAL COLLEGE at Edinburgh will be completed and occupied within two-and-a-half years, it was forecast by Councillor Craig H. Richards, chairman of the local education committee, recently, when he moved that no action be taken on a request by Edinburgh Trades Council that the committee should meet a deputation to consider delays in building the college.

AGAINST STRONG COMPETITION from Swedish and German manufacturers, the British materials handling division of Yale & Towne Manufacturing Company, have been successful in obtaining an order for 40 Worksaver pallet trucks worth approximately £25,000. These will be delivered over the next 18 months to the Fred Olsen Line, Norway. The trucks have been specially designed for use on board ships.

AN AWARD OF £110 made by Rolls-Royce, Limited, of Derby, under a suggestions scheme, was made on September 13 to Mr. W. S. Shaw, who works at the Derby factory. Mr. Shaw's idea cuts down the amount of scrap produced during the polishing of turbine blades for Rolls-Royce jet engines. The amount of awards in the firm's suggestion scheme is based on the amount of money saved by the ideas.

ON STAND NO. 2 at the Heating, Ventilating and Air Conditioning Exhibition at Olympia (September 26 to October 6) Foster Instrument Company, Limited, of Letchworth, will be showing a new indicating temperature controller, fitted with the Resilia shockproof moving coil and magnet system. The instrument, which incorporates a photo-sensitive control system, will be shown operating in an ambient temperature of 130 deg. F.

DON VALLEY ENGINEERING COMPANY, LIMITED, of Wheatley Lane, Doncaster, is engaged on the largest contract it has ever handled. It is for the preparation plant for the Elsecar Main Colliery, near Barnsley, which will have a capacity of 450 tons per hour. The value of the two-year contract is believed to approach the six-figure mark. Concrete Designs, Limited, of Leeds, has been sub-contracted for the foundations and civil engineering side of the project.

THE ENGINEERING DIVISION of Jaguar Cars, Limited, Coventry, which was previously scattered, has been transferred into a self-contained unit at the Browns Lane factory. It covers more than 150,000 sq. ft.—about one tenth of the firm's total factory space—and provides for all engineering administration, design, research, testing and development to be carried out in a central situation with complete co-ordination. Some new buildings have been put up as part of the reorganization.

BRITISH OXYGEN COMPANY, LIMITED, have agreed with the Board of Trade to lease a site near Dumbarton on which to establish progressively a new light engineering factory, while leaving the oxygen plant manufacturing at the existing Edmonton Works. It is estimated that over two years will elapse before the first stage of the new factory is established. Thereafter, there will be a gradual build-up to a total strength of about 2,000 employees during the following three to four years.

MR. COLIN D. MACLACHLAN, who recently resigned from Welin-MacLachlan Davits, Limited, has joined Mr. T. M. Wilks, Mr. J. A. Wilks, and Mr. F. D. Morison in forming a new company known as McLachlan Davits, Limited. He will be managing director of the new company. He also joins the board of Viking Marine, Company, Limited. The new company is to carry out research into improving the design of conventional lifeboat davits in conjunction with Viking Marine who will carry out similar research in improving lifeboat design. From the middle of October, the address of the company will be 308, Renfrew Street, Glasgow, C.3.

NORTH CENTRAL WAGON AND FINANCE COMPANY, LIMITED, Rotherham, is celebrating its centenary. It was formed in 1861 to finance by hire-purchase railway wagons to the railways and collieries. The company has issued a booklet, "Payment Deferred," in celebration of the centenary. It is the oldest hire-purchase finance house in the country, and probably the oldest in the world. In its first year it made a profit of £128. Since then a profit has been made every year, and only once, in 1940, has the company failed to pay a dividend. One hundred years ago its standard terms for letting wagons to railway companies, collieries and quarries varied from £9 to £14 annual rent.

BRITISH TRANSPORT COMMISSION announce they have ordered a new 7,000-ton passenger ship to be constructed by Alexander Stephen & Sons, Limited, of Linthouse, Glasgow. It will operate on the Eastern Region's night service between Harwich and the Hook-of-Holland. The vessel, expected to go into service in mid-1963, will be a two-class ship to carry 750 passengers and will have about 280 cabins providing sleeping berths for over 600 passengers. There will also be space for cargo and a limited number of cars. It will be a twin-screw-geared turbine vessel, 404 ft. long and a moulded breadth of 57 ft. 6 in.; it will be fitted with Denny-Brown/A.E.G. stabilizers.

MR. THOMAS WHITHAM, in his annual review of Blakey's Boot Protectors, Limited, Leeds, states that the order flow in the year to last March called for full-capacity working of the plant. The labour shortage

News in Brief

became progressively worse. Increases in wage and other costs have resulted in trade profits easing from £142,704 to £137,086, despite greater productivity. He says that the intake of orders this year so far has remained satisfactory and sales are running at a somewhat higher level than last year. Heavy spending on furnace equipment to comply with the Clean Air Act is an immediate problem. "All in all," says Mr. Whitham, "it is extremely difficult to say how the financial results for the year ending March 31, 1962, will work out, and we refrain from doing so." The company has reopened negotiations with the British Transport Commission on the question of buying land next to the Armley works. If the land can be bought, room could be provided for reorganizing some badly cramped departments.

TWO OF AUSTRALIA'S motor car manufacturers—Ford, and the British Motor Corporation—have announced that output will be increased. The Ford Company stated that additional staff would be recruited for its plant at Broadmeadows, near Melbourne, where 175 men would be engaged in the next few weeks. Staff had already been increased by 50 in Brisbane and 160 in Sydney. Ford's managing director, Mr. John Macintyre, said that accumulated stocks of motor vehicles have been substantially reduced and staff expansion was now needed to meet market demands. The British Motor Corporation will expand production of its range of Morris and Austin vehicles by 15 per cent. over the next three months to meet anticipated demand for these vehicles. As a result, it is expected that the company may soon take back some of the 360 employees who were put off earlier this year. As from September 18, Australia's biggest manufacturer of motor vehicles—General Motors-Holden—started laying off 8,150 employees for periods of between five and 13 days. For a while, the company was forced to shut down its Woodville plant in South Australia, following a bomb hoax.

Obituary

Mr. ALBERT HENRY GOODALL, managing director of A. H. Goodall, Limited, agricultural engineers, Welton, near Lincoln, has died aged 61.

The death occurred on September 18 of Mr. SAMUEL MOORHOUSE, founder of S. Moorhouse & Son, Limited, metal refiners, Hillhouse Smelting Works, Huddersfield. He was 77.

Sir ELLIS HUNTER, chairman of Dorman, Long & Company, Limited, and its principal subsidiaries, and president of the British Iron and Steel Federation from 1945 to 1953, died on September 21. Born on February 18, 1892, he had been a leading figure in the iron and steel industry for many years. He played a major part in formulating the industry's Plan of Development, which was submitted in 1945 and later approved by the Government and published as a White Paper. He was knighted in 1948 and was made KBE this year. Sir Ellis who had been chairman since 1948 and was also managing director of Dorman, Long & Company, retired at the end of March from all executive appointments in the group, including the joint managing directorship of Dorman Long (Steel), Limited. It was then announced that he would continue as chairman of the parent company and its principal subsidiaries. He had been a member of the board of Dorman, Long & Company since 1938, when he was also appointed deputy chairman of the company.

New Patents

Descriptions of metallurgical patents given below have been taken from details published in the Official Gazette of the United States Patent Office.

849,534. Inland Steel Company, 38, South Dearborn Street, Chicago, Illinois, USA.

Improvements in the casting of ferrous metals—in particular the Patent relates to means for controlling or maintaining the temperature of molten ferrous metal during pouring into a mould.

849,687. Carpenter Steel Company, Reading, Pennsylvania, USA.

So-called big-end-up ingot moulds. In particular this invention makes claims for moulds for forming ingots of steel from molten metal.

849,751. F. C. Pearce, 196, Hollyfast Road, Coventry, Warwicks, and Foundry Equipment, Limited, Linslade Works, Leighton Buzzard, Beds.

Centrifugal-casting processes and apparatus. It is the objectives of this invention to minimize the turbulence or splashing of the molten metal when being fed into the machine; and to provide a process for varying the speed of rotation of the mould.

850,005. Madison-Kipp Corporation, 201, Waubera Street, Madison, Wisconsin, USA.

This Patent refers to die-casting machines and devices for removing air or other gases from the die cavity during the metal-shooting operation.

850,235. Birmidal Developments, Limited, Woodgate Works, Clapgate Lane, Birmingham, 32.

A composite foundry core having a preformed, prehardened insert having a surface which forms part of the pattern surface of the composite core, and embedded in a body part made of moulding material which has been hardened by a catalyst or gaseous hardener. The insert is comprised of material which when hardened has a greater mechanical strength than that of the hardened material constituting the body part of the core.

850,245. Société Civile d'Etudes de Centrifugation, 6, rue Daru, Paris, Seine, France.

Process and apparatus for centrifugally casting metal with continuous stripping.

850,314. Mannesmann, A.G., Mannesmannufer 1b, Düsseldorf, Germany.

Apparatus for the production of feeder-heads in ingot moulds, using vibration generators. For the direct moulding and compacting of the refractory materials in the recess of the ingot mould, one or more vibration generators are arranged at the inner side of the pattern and are controlled asynchronously if necessary.

850,331. H. F. Shroyer, 7, Hatch Street, Mystic, Connecticut, USA.

A "cavityless" casting method. The main claim is for a method of casting using a combustible pattern which burns without appreciable residue—such as expanded plastics of the polystyrene or polyethylene type. The pattern is embedded in a mould and converted substantially in its entirety into a gaseous state by the poured casting material, and simultaneously replaced by this material.

850,710. Combustion Engineering Inc., 200, Madison Avenue, New York, 16, USA.

Apparatus for stripping the cores from poured moulds; and for turning the drags thereof over in mould-assembling installations, such as those described in B.P. 704,815.

Book Review

Foundry Moulding Sands of India, by Jatinder Mohan *et al.* Published by the (India) Council of Scientific and Industrial Research, New Delhi, India; price 15 rupees (£1 10s.).

This excellent book describes the occurrence, composition and properties of known deposits of foundry sands and bonding clays in India. No similar work on this scale has been attempted in Britain since Boswell's monograph was published in 1918, and the Indian authors have the advantage that methods of testing sand have been developed in the interval.

After short preliminary chapters on the occurrence and desirable properties of foundy sands, the methods of testing are described, those standardized by the American Foundrymen's Society being used throughout, with the addition of the shatter test and an informative, if lengthy, series of sintering tests. Final assessment is by using the sand to make test castings. The chemical and mineralogical composition of the more important sands are also given. The design of the test procedure is such that all the information required to decide whether a sand is suitable for a particular purpose is quoted.

The greater part of the book is taken up by the test results. In reporting, the materials tested have been divided into five classes—natural sand, crude silica sand, high-silica sand, zircon sand and bonding clay, each receiving a chapter, the results being summarized and given with suggested fields of use in the final chapter. The results are set out clearly and with adequate tables and graphs. With advantage, the table of contents might be amplified or an index added so as to enable the reader to find reports on individual sands more quickly, and a map showing the location of the deposits would be useful, but these are minor points and do not detract from the work.

Two points call for some comment: In the first place, the shatter index is measured on a non-standard testpiece, but even allowing for this the results themselves are incomprehensible, the index falling with increasing moisture content in the mouldable range. Thus, in the reviewer's opinion the reader would be advised to ignore the shatter-test results.

The second point concerns reporting. In the mechanical analyses of the natural sands, the clay content is reported under "sand after washing," no figure being given for the "sand as received." Perusal of the text shows that the clay content reported is that of the raw sand, but this method of expression, which is repeated in the graphs, causes confusion.

A few other minor errors have crept in. For example, on p. 14 it is stated that "if sand with a diameter two fifths that of the grains of the base sand . . . are added, permeability is not affected." This is not true—permeability is reduced; it is pore space which is not affected. Again, on p. 7, zircon sand is described as "mainly a silicate of sodium," an obvious misprint which should be corrected in any subsequent edition.

No points which are open to criticism are of sufficient importance to detract from the real value of the book. Anyone who has had experience in the examination of raw sands to determine their suitability for foundry use will appreciate the enormous amount of work carried out by the authors, the thoroughness of the investigation and the way in which the results have been condensed without loss of clarity. It is difficult to see how any present or prospective foundry operator in India can afford to be without a copy.

W. B. PARKES.

Publications Received

Comité Européen des Associations de Fonderie, Report No. 4, from the Commission for the internal organization of foundry concerns.

This report is in French and is a most illuminating example of Latin logic. There is no arguing from the particular to the general, but particular examples are given to reinforce the general argument. One of these is to the hanging of a picture on a wall and the mind of the British reader instinctively goes back to Jerome K. Jerome's well known exceedingly humorous treatment of this subject, but the underlying principles are the same.

The thesis terminates in the production of an optimum manning chart which is well suited for the larger foundry concerns. "Large" is defined in the report as employing more than 200 people, medium ranging between 101 and 200 and small below 100. The reviewer would class "small" as carrying up to 50, "medium" from 50 to say 300, and above that figure "large."

In a study of this character, it is well to start an appraisal with the owner of a little jobbing foundry who organizes and controls everything and to consider the growth of his firm. First he appoints a foreman and then a salesman. If he progresses to become a medium-size concern, then a scheme could certainly be devised for the manning of such a foundry, but it would have to be very elastic, depending on the nature of the production. For the largest ones, the scheme developed by the Commission would well serve as a basis for implementation.

Bulletin of the Association of Bronze & Brass Founders. Issued quarterly from the secretariat, 69, Harborne Road, Edgbaston, Birmingham, 15.

The activities of the Association, together with some essential business information on the raw materials market, are interestingly dealt with in this 22-page publication. Obviously, a basic objective of the members of the Association is to further the sale of copper-base castings. This year, the efforts being made include in this direction a 14-member joint stand at the Engineering Materials and Design Exhibition (Earls Court, November 13 to 18) which is being supported by the Copper Development Association; British Nonferrous Metals Research Association; British Standards Institution and the International Nickel Company (Mond), Limited. Moreover, market development for copper-base castings will be considered at a number of regional meetings.

This issue of the *Bulletin* contains information on the publication and content of BS.1400—specifications for copper-alloy ingots and copper-alloy castings. The ABBF publication also reviews *in extenso* the activities of the European Committee of Foundry Associations, and carries tables from the 1958 Census of Production as related to copper-base castings production. Those in the industry who are not members of the Association are advised to ask for a specimen copy of the *Bulletin* as it does show just what the the ABBF is doing.

Exporting to East Africa. Published by the Export Publicity & Fairs Branch, Board of Trade, Horse Guards Avenue, London, S.W.1. Free on request.

On the recommendation of the Export Publicity Council the Board of Trade *Journal* has published a survey on marketing and publicity in East Africa. Aimed particularly at exporters new to the area the survey gives topographical, economic and political information about Kenya, Uganda and Tanganyika. It

Publications Received

tells how to tackle the market, advises on local advertising methods, and on choosing an agent. It shows the distribution of local purchasing power, gives information about inland freight services and charges, and sums up the market for both consumer and capital goods. There is information about trading conditions in the area and statistics showing local imports and exports. Future development and the present location of industry are also featured. There are maps and tables of interest to exporters and the survey is illustrated with photographs which portray something of the challenge of the market.

Albright & Wilson—a Survey of a Chemical Group. Issued by Albright & Wilson, Limited, 1, Knightsbridge Green, London, S.W.1.

After learning the composition of this group, it is easy to understand why a 72-page brochure is necessary to deal with its activities. The early beginnings of the company were devoted to the manufacture of phosphorus, mainly for the match trade. This element with its compounds and derivatives enters an amazing number of industries, and, as a metallic alloy, is used by non-ferrous founders. Meanwhile the associated companies were making essential oils, fruit flavourings, materials for cosmetics and a host of other products. In recent times, the group has included silicones and ingredients for detergents. What might have been expected at the beginning of the book—that is, the history of the company and its founders—is relegated to the end. The brochure is excellently produced and good use has been made of colour printing, making for the layman very interesting reading.

Stone-Platt Industries, Limited—A Guide to the products and services of Group Companies. Issued from Oceanic House, 1a, Cockspur Street, London, S.W.1.

When a concern employs more than 19,000 people, spread over some 50 companies, it obviously requires a substantial brochure to outline all the activities of the organization. Actually, 72 pages are devoted to setting out all the activities and services of the Stone-Platt group, which include a number of foundries, and a foundry equipment manufacturing company. The group, however, is best known as manufacturers of marine propellers and textile machinery.

Quality-controlled Steel Castings. Mail card issued monthly by K. & L. Steelfounders & Engineers, Limited, Letchworth, Herts.

This month's postcard deals with K. & L. castings for nuclear-power stations and examples are shown installed on a gas-valve actuator test and assembly rig which simulates the actual conditions which will prevail at the Trawsfynydd nuclear-power station where this equipment will finally be applied. The illustrations are colourful and serve to indicate the quite considerable applications for castings in the nuclear-energy field.

Grinding Carbide Tools (Report No. 49). Published by the Production Engineering Research Association, Melton Mowbray, Leics; price 7s. 6d.

This is a clearly written, appropriately illustrated account of the results to be expected when turning alloy steel, using various methods and materials.

Catalogues

Ferro-alloy Briquettes. The alloys division of Union Carbide, Limited, 8, Grafton Street, London, W.1, in publication No. 150A, deals with briquettes used in ironfounding practice. The company's range includes a 45-50 per cent. silicon briquette, a zirconium-silicon; a manganese, a silicon-manganese and a chromium-alloy briquette; the five carry distinct colours for ready identification. In the brochure, very useful ready-reckoners are printed for each type showing, against weight of charge, the number of briquettes to add to yield a definite amount of the requisite element in the ultimate composition of the metal.

Industrial Plant Stock List. In this fully illustrated 16-page monthly booklet, issued by the industrial plant department of Thos. W. Ward, Limited, Albion Works, Sheffield, is listed the company's current stock of industrial plant for sale, and details are also given of the department's activities in specialized fabrication. The Sheffield firm intends to send the issues, as published, to all potential customers on a specialized list, but will be pleased to add further names.

Electric Motors. Lancashire Dynamo & Crypto, Limited, Trafford Park, Manchester, have used a six-page folder (publication SL. 2) to detail the characteristics of the Crypto-D range of electric motors. In the fan-cooled, cage-rotor motors, the range goes from ½ to 50 h.p. Technical details are given for both flanged- and foot-mounted types.

High-frequency Electric Tools. Wolf Electric Tools, Limited, Pioneer Works, Hanger Lane, London, W.5, have issued an eight-page catalogue covering a wide range of drills, reamers, screw drivers, shears, grinders and sanders. It is replete with all necessary data, such as catalogue reference numbers, capacity, net weight and electrical requirements.

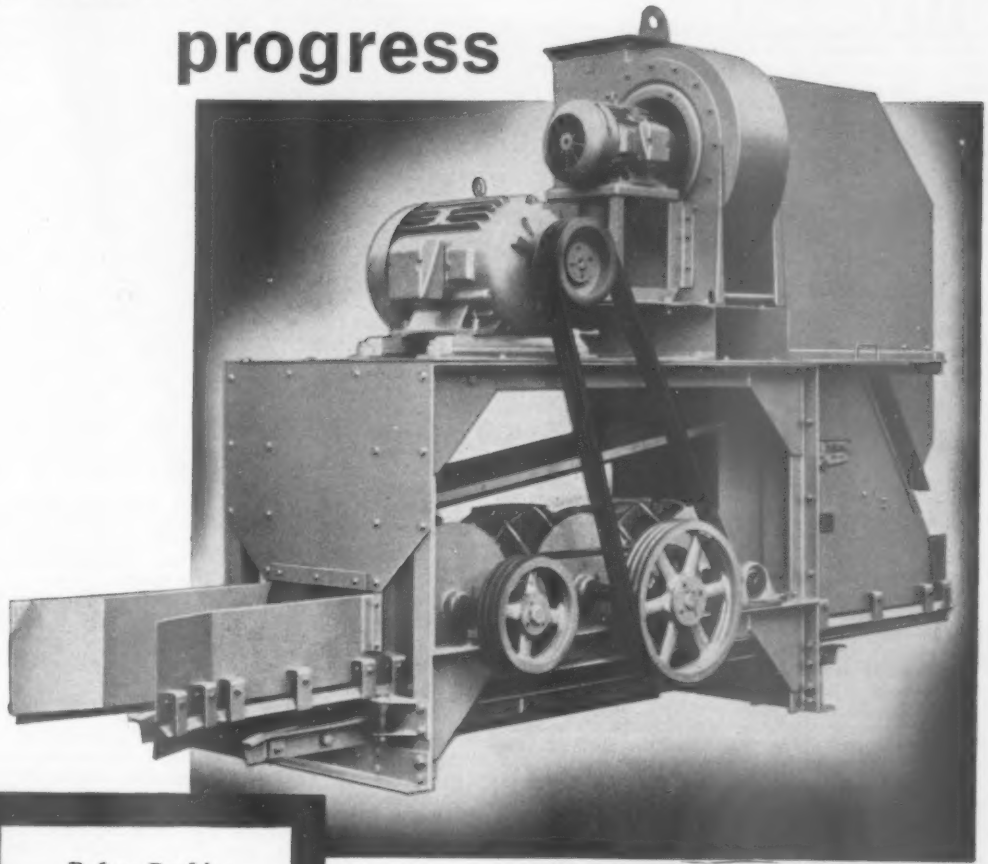
Motor-control Centres. In technical description leaflet No. 445, the General Electric Company, Limited, Witton Publicity Department, Birmingham 6, give details of the company's motor-control centres, first marketed some three years ago, which can now accommodate starters up to 150 hp and switch fuses of up to 200 amps. with no increase in cubicle size.

Geared Motors and Reduction Gears. In publication No. 617, which resembles an air-travel ticket, Crofts (Engineers), Limited, Bradford 3, describe and illustrate a range of geared motors and reduction gears designated "Ritespeed." The range covers units of up to 80 hp, those of up to 20 hp being available from stock.

Vitreous Enamelling. In publication V6B, Metal Porcelains, Limited, Cornwall Road, Smethwick, Staffs, illustrate the services and plant available to manufacturers of vitreous-enamelled goods. The service appears to be quite comprehensive as it includes the supply of frits, and plant for the millroom, pickling, spraying, drying, and fusing.

Photographic Materials and Equipment. Kodak, Limited, Kodak House, Kingsway, London, W.C.2, have now issued their 1961 priced catalogue of the wide variety of material and equipment they handle. It takes the form of a specially-bound, loose-leaf book running to over 200 pages.

pattern for progress



Baker Perkins
Foundry Machinery

The PEKAY aerator/coolerator

* Continuously processes and conditions foundry sand * Fits flat, troughed, horizontal or inclined rubber belt conveyors. * Specially designed undercarriage does not increase wear or tension on belt. * Cheaply and quickly installed. One of the range 10 tons to 450 tons. 18″ to 48″ wide belts. * Increases output and improves quality from existing mixing plant.

Write for further details of Baker Perkins Pekay Aerators/Coolerators to :

BAKER PERKINS LTD., ENGINEERS,
Foundry Machinery Department, Bedewell Division, Hebburn-on-Tyne, Co. Durham. Tel. Jarrow 897124

B.P.F. 14

Raw Material Markets

Iron and Steel

Current outputs of pig-iron in all grades continue in excess of demands, and although production is well below furnace capacity most makers have tonnages to spare. On account of the restricted ingot production at the steelworks their consumption of basic pig-iron continues to fall, as do also the outputs of the furnaces as these are controlled by demands. The foundry grades of pig-iron are plentiful and makers have no difficulty in coping with the orders arising. Much larger tonnages could be made available if demands warranted, but at present there is no sign of improvement.

The low-phosphorus irons are in heaviest demand by the engineering and speciality foundries producing high-quality castings, which are also taking up reasonably good tonnages of hematite and some refined iron. Demands, however, are on a fluctuating basis, and there is little forward buying mainly due to the present easy supply position and also to the uncertainty of their future requirements. High-phosphorus irons used by the light, jobbing and some of the engineering foundries are also readily available.

The pattern of business remains unchanged at the iron foundries, and most establishments are working below capacity levels. The engineering and speciality foundries are fairly well employed but demands for high-duty castings show little improvement on recent delivery schedules, and in some instances are on a reduced scale. Most of these foundries maintain a five-day working week, but some find it increasingly difficult to do so and fear that unless business improves some reduction in working hours may have to be made. Most of the light foundries are short of work, chiefly those catering for the domestic utensil trade. The building trades continue to take up fairly good quantities of castings.

The foundries are well provided with scrap and apart from some special grades, arisings are adequate to satisfy present needs. Foundry coke, ganister, limestone, and firebricks are in good supply.

There is little change in the trading position at the re-rolling mills, most of which are short of work, and plants are working much below their productive levels. There is no improvement in the demand for their products, and day to day arisings of orders, on which their production depends, are moderate, apart from reinforcing rods and bars which are being called for in fairly good quantities. The demand for small bars, light sections, strip, etc., is barely sufficient to make up rolling programmes, and entails many roll changes for the meagre tonnages now being booked.

Home steelworks could supply a much larger tonnage of mild steel and carbon billets than that now being specified and outputs are curtailed by the small amount of business available for both these qualities. The supply of alloy steels is also easier and reasonable delivery dates are now being quoted. Arisings at the steelworks of suitable re-rolling defectives and crops are being taken up by the re-rollers.

Non-ferrous Metals

Once again tin prices are on the rise in London, Singapore, and New York. Quite aside from the satisfactory level of demand from all sources the central issue now moving the market is the assurance given by the United States in Singapore that the tin producing countries would be consulted before any sales were made from the national stockpiles. More than that, it now seems unlikely that the GSA's request to Congress for the release of 10,000 tons of strategic stockpile metal will not come up for decision in the present session.

In London demand is good and sellers are reluctant to part with their metal. In Singapore the market is active and the outlook is again set fair, and in the US the consumer buyer is much in evidence, the quotation rising above $1.21 cents a pound.

The copper market is apathetic in London. Demand is not good, stocks at over 22,000 tons are the highest for years, and the news has now come through that all Union Miniére mines and plants are in full production. Against this background the cease fire in Katanga and the renewed labour unrest in Chile made little or no impact. The hard fact would seem to be that world smelter production is still outrunning current consumption so that there is not much scope for prices to rise appreciably.

Statistics released by the US Copper Institute for the month of August showed that the world position for copper was reasonably satisfactory. But the situation in the United States during that month was disappointing, with production higher than in July and also end-of-month stocks. With this in mind it is difficult to understand why Phelps Dodge have announced a return to full production. The US copper price remains unchanged at 31 cents a pound, but the intake price of custom smelters for scrap has been reduced to 25¼ cents a pound.

Lead is quietly steady in New York and featureless in London. In the US the quotation is still 11 cents a pound and in London it is fairly steady around £64 a ton. There is nothing in the outlook likely to influence prices one way or the other.

Zinc is an improved market largely on the settlement of the strike at General Motors in the USA. In London the price is now around £75 a ton and in the US it is called at 11½ cents a pound.

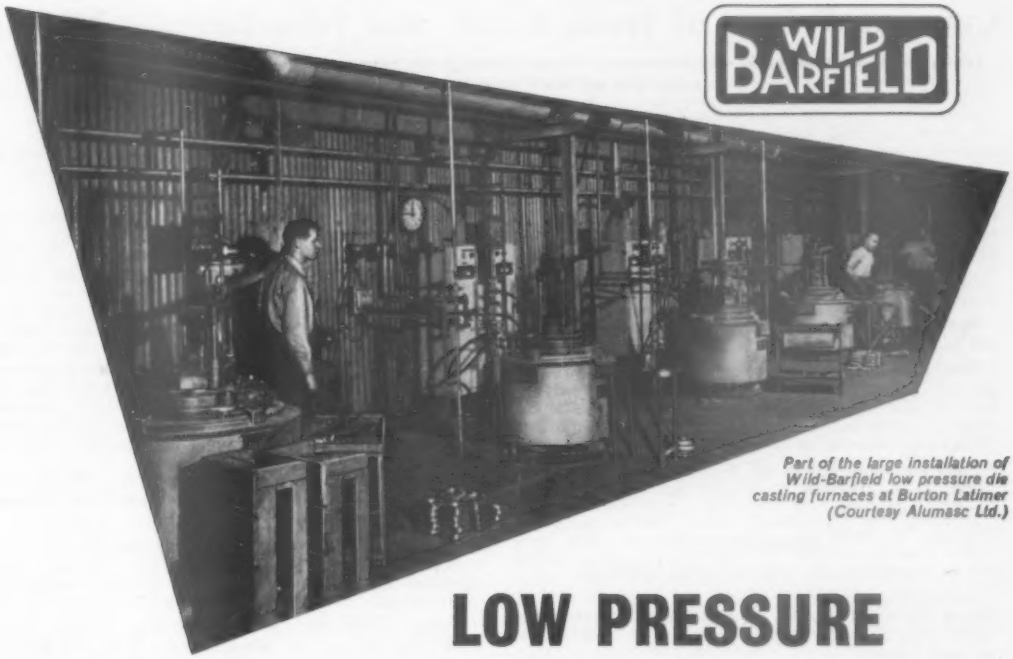
Open-day at Davy United

Over 6,000 people attended an open-day at the Darnall works of the Davy-United Engineering Company, Limited, Sheffield, on Saturday, September 23. Each employee was allowed to take up to three guests. They were able to tour the offices, departments and machine-shops and there was also a display of instruments, and of photographs taken by the firm's Photographic Society. Many people visited the exhibition of paintings by Mr. Harry Baines, a former student at the Manchester College of Art, who was commissioned by Davy-United to visit the Durgapur Steelworks, West India and record his impressions. An exhibition of the work by apprentices included a short history of Davy-United from 1830 to 1961 and some original letters concerned with the firm's beginnings, and century-old newspaper cuttings.

W. E. & F. DOBSON, LIMITED, hydraulic engineers, have transferred their machine-shop from the Basford Works, Nottingham, to Mile End Road, Colwick Estates, Nottingham.

IT IS POINTED OUT by English Steel Corporation, Limited, that Mr. W. E. A. Redfearn, who presented the directors' trophy at the firm's annual garden-produce show on September 2, is a director of ESC and managing director of English Steel Forge & Engineering Corporation, Limited, and not—as stated in the JOURNAL, September 14—managing director of ESC. Apologies are offered to all concerned.

WILD BARFIELD



Part of the large installation of Wild-Barfield low pressure die casting furnaces at Burton Latimer (Courtesy Alumasc Ltd.)

LOW PRESSURE ALUMINIUM DIE CASTING FURNACES*

(Mains Frequency Induction Heated)

Simple to service
No elements to burn out
No channels to clean
No metal contamination
Accurate temperature control

Over 30 furnaces supplied to one well-known American Motor Manufacturer and currently used for production of Aluminium engine castings

WILD BARFIELD

ELECTRIC FURNACES FOR *ALL* HEAT-TREATMENT PURPOSES

**Developed in conjunction with Alumasc Ltd. and specially designed for their low pressure die casting process.*

WILD-BARFIELD ELECTRIC FURNACES LIMITED

ELECFURN WORKS · OTTERSPOOL WAY · WATFORD BY-PASS · WATFORD · HERTS · TELEPHONE: WATFORD 28091

Current Prices of Iron, Steel, and Non-ferrous Metals

(Basis prices, delivered unless otherwise stated. Prices following side headings marked* are subject to an increase of 1 per cent. under Iron and Steel Board Price Determination, 1961, No. 2.)

September 27, 1961

PIG-IRON

* **Foundry Iron.**—No. 3 IRON, CLASS 2, 10-ton lots or over, Middlesbrough, £21 17s. 0d.; Birmingham, £21 9s. 3d.

* **Low-phosphorus Iron.**—Over 0.10 to 0.40 per cent. P, 10-ton lots or over, £23 5s. 0d., delivered Birmingham; £23 10s. 0d., delivered Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 6s. 6d.; South Zone, £25 9s. 0d.

Refined Malleable.—P, 0.10 per cent. max.; North Zone, £26 6s. 6d.; South Zone, £26 9s. 0d.

* **Hematite.**—Si less than 2 per cent, S. & P. over 0.03 to 0.05 per cent., 10-ton lots or over: N.-E. of England (local iron), £23 19s. 0d.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 9s. 0d.; Birmingham, £25 13s. 0d.; South Wales (Welsh iron), £23 19s. 0d.

* **Basic Pig-iron.**—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leicestershire in 10-ton lots or over.

FERRO-ALLOYS

(per ton unless otherwise stated, delivered)

Ferro-Silicon (6-ton lots and over).—45 per cent. Si, £45 0s. 0d. to £48 0s. 0d., scale 15s. 0d. per unit, lumpy, 75 per cent. Si, £62 10s. 0d. to £66 10s. 0d., scale 15s. 0d. per unit, lumpy.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 14s.1d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 10s. 3d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 13s. 3d. per lb. of W.

Ferro-chrome (6-ton lots and over, lumpy).—4/6 per cent. C, £80 10s. 0d. to £84 10s. 0d., basis 60 per cent. Cr scale 27s. 0d. to 28s. 6d. per unit; over 6 per cent. C, £79 0s. 0d. to £82 10s. 0d., basis 60 per cent. Cr, scale, 27s. 0d. to 28s. 6d. per unit; 2 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 1 per cent. C,* 1s. 8d. to 1s. 11½d. per lb. Cr; 0.15 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr.; 0.10 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.06 per cent. C,* 1s. 10½d. to 2s. 1d. per lb. Cr. * Average 68-70 per cent.

Metallic Chromium.—98/99 per cent., 6s. 19d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £275 0s. 0d.; 96/98 per cent., £285 0s. 0d.

Ferro-columbium.—65/67 per cent. Cb + Ta, 19s. 0d. per lb., Cb + Ta.

Ferro-manganese (Standard).—78 per cent., £58 10s. 0d.

SEMI-FINISHED STEEL

* **Re-rolling Billets, Blooms, and Slabs.**—BASIC: Soft u.t., 100 tons and over, £31 15s. 6d.; tested, 0.08 to 0.33 per cent. C, 100 tons and over, £32 5s. 6d.; hard (0.41 to 0.60 per cent. C), 50 tons and over, £33 17s. 0d.; silico-manganese, 50 tons and over, £42 16s. 6d.; free-cutting, 50 tons and over, £35 4s. 6d. SIEMENS MARTIN ACID (50 tons and over): Up to 0.25 per cent. C; £40 11s. 0d.; silico-manganese, £43 4s. 0d.

* **Billets, Blooms, and Slabs for Forging and for Stamping** 50 tons and over).—BASIC: Soft, up to 0.33 per cent. C, £37 0s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £38 2s. 6d.; acid, up to 0.25 per cent. C, £41 14s. 0d.

FINISHED STEEL

* **Heavy Plates and Sections** (50 tons and over).—Ship plate (N.-E. Coast), £40 7s. 0d.; boiler plates (N.-E. Coast), £42 17s. 0d.; floor plates (N.-E. Coast), £41 16s. 0d.; angles (N.-E. Coast), £38 1s. 6d.; joists (N.-E. Coast), £37 17s. 6d.

* **Small Bars, Sheets, etc.**—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £39 1s. 0d.; under 10 tons to 4 tons, £40 18s. 6d.; under 4 tons to 2 tons, £41 3s. 6d.; hoop and strip, coils, 100 tons and over, £38 0s. 0d.; uncoated strip mill coils, hot rolled, under 3 mm. to 12g., 25 tons to under 50 tons, £43 16s. 0d.; black sheets (hand mill), 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £67 4s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £67 16s. 0d.; nickel-chrome, £100 18s. 0d.; nickel-chrome-molybdenum, £113 11s. 0d., in lots of 25 tons and over.

NON-FERROUS METALS

Copper.—Cash, £222 15s. 0d. to £223 0s. 0d.; three months, £227 0s. 0d. to £227 5s. 0d.; settlement, £223 0s. 0d.

Copper, Tubes, etc.—Solid-drawn tubes, 2s. 2½d. per lb. rods, 244s. 6d. per cwt. basis; 20 s.w.g., 284s. 0d. per cwt.

Tin.—Cash, £933 0s. 0d. to £935 0s. 0d.; three months £946 0s. 0d. to £947 0s. 0d.; settlement, £935 0s. 0d.

Lead (Refined Pig).—Second half September, £63 12s. 6d. to £63 15s. 0d.; second half December, £65 5s. 0d. to £65 7s. 6d. settlement, £63 15s. 0d.

Zinc.—Second half September, £73 15s. 0d. to £74 0s. 0d.; second half December, £73 15s. 0d. to £73 17s. 6d.; settlement, £74 0s. 0d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £113 15s. 0d.; rolled zinc (boiler plates), all English destinations, £111 10s. 0d.; zinc oxide (Red Seal); d/d buyers' premises, £90 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes 1s. 9½d. per lb.; sheets to 10 w.g., 194s. 6d. per cwt.; wire, 2s. 8½d.; rolled metal, 194s. 6d. per cwt.

Brass (Brazing).—BS1400, SCB2, £172; SCB3, £169.

Brass (High Tensile).—BS1400, HTB1, £189; HTB2 £209; HTB3, £225.

Gunmetal.—BS1400, LG2, £209; LG3, £219; G1, 1½% £280;

Phosphor Bronze.—BS1400, PB1 (AID released), £311; BS1400, 90/10/1, £299.

Leaded Phosphor Bronze.—BS1400, LPB1, £235.

Phosphor Bronze Strip, etc.—Strip, 295s. 3d. per cwt.; wire, 4s. 2d. per lb.; rods, 3s. 4½d.; tubes, 3s. 5d.; chill cast bars, solids 3s. 6d.; cored, 3s. 4½d. (CHARLES CLIFFORD LIMITED).

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 11½d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 4½d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 3½d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 2½d. to 2s. 3d. per lb.; Antimony, English, 99 per cent., £230 0s. 0d. Quicksilver, ex-warehouse, £62 0s. 0d. Nickel, £660 0s. 0d. Aluminium, ingots, £186 0s. 0d.; aluminium bronze (BS1400), AB1, £236; AB2, £243.

Company News

COLTNESS IRON COMPANY, LIMITED—Interim dividend for the year ending September 30 is unchanged at 5 per cent. Last year's interim was followed by a final of 7½ per cent.

J. SAMUEL WHITE & COMPANY, LIMITED, shipbuilding and marine engineers, of Cowes, I. of W.—Shareholders have given approval for the company's acquisition of the shares of J. Arthur Dixon, Limited.

PICKFORD HOLLAND & COMPANY, LIMITED, manufacturers of basic bricks, fire-resisting products, etc., of Sheffield—Trading profit for the year ended July 2, 1961, increased from £350,864 to £477,789, and after all charges including tax of £164,750 (£94,650) there is a net profit of £151,916 compared with £111,636. The 20 per cent. dividend is repeated with a final of 15 per cent.

WILLIAM JACKS & COMPANY, LIMITED, metal merchants, importers and exporters, of London, E.C.2—Estimated profits for the first half of the current year are within a few pounds of those for the same period of the previous year, said Mr. W. Gray Buchanan, chairman, at the annual meeting. Orders on hand at June 30 showed an increase compared with last year.

UNIVERSAL ASBESTOS MANUFACTURING COMPANY, LIMITED—Announcing an unchanged interim of 5 per cent. on the increased capital, the board states that this is not intended to imply the maintenance of the same total rate of dividend as the previous year, but is solely to reduce the disparity between interim and final payments. The company continues to trade satisfactorily and present indications are that profits for the current year will be somewhat above those of the previous year.

R.F.D. COMPANY, LIMITED, manufacturers of survival, rescue, and industrial safety equipment, etc., of Godalming (Surrey)—Profits, before tax, for the year amounted to £183,485. The proposed final dividend of 11 per cent. makes 16 per cent. for the year and is equivalent to the 20 per cent. distribution of the preceding 15 month period. The company is now a diversified organization and export trade is the major part of its turnover.

ACROW (ENGINEERS), LIMITED—Consolidated trading profits for the year ended March 31, 1961, rose from £699,312 to £774,310, but the net balance was slightly lower at £297,533 against £303,461. A final dividend of 12½ per cent. makes a 50 per cent. total, compared with the previous equivalent of 43.18 per cent., taking a one-for-10 scrip issue into account. The figures this year include for the first time the profits of Thos. Storey, Limited, which now has the highest order-book in its history. Group sales are higher for the first five months of the current year than the corresponding period of last year.

VOKES, LIMITED, filtration and silencing engineers, of Guildford (Surrey)—The group has a very satisfactory order position, which is sufficient to ensure full production for some months ahead, says the chairman, Sir Ian Stewart-Richardson. He warns, however, that economies and curtailment of spending power must reflect directly on the group's customers, and the cancellation of long-term orders under such conditions is always a possibility. Negotiations are well advanced for the acquisition of a substantial interest in a small engineering company within the Common Market area.

PIG IRON, **All Grades**
METALLIC ABRASIVES
SHOTBLASTING MACHINERY
FOUNDRY MACHINERY

WILLIAM
JACKS
AND COMPANY LIMITED

HEAD OFFICE
WINCHESTER HOUSE
OLD BROAD STREET
LONDON EC2
LONdon Wall 4774

And at:
BIRMINGHAM 5
Lichfield House,
Smallbrook Ringway
Midland 3375/6

GLASGOW C2
93 Hope Street
Central 9969

FERRO SILICON 12/14%
ALLOYS & BRIQUETTES
FOUNDRY COKE
LIMESTONE
GANISTER
MOULDING SAND
REFRACTORIES

CLASSIFIED ADVERTISEMENTS

PREPAID RATES: **Twenty words for 10/- (minimum charge) and 4d. per word thereafter. Box numbers 2/6 extra per insertion (including postage of replies). Situations wanted 2d. per word throughout.**

Advertisements (accompanied by a remittance) and replies to Box Numbers should be addressed to the Advertisement Manager, Foundry Trade Journal, John Adam House, 17/19, John Adam Street, Adelphi, London, W.C.2. If received by first post Monday advertisements can normally be accommodated in the following Thursday's issue.

SITUATIONS WANTED

FOUNDRY TECHNICIAN, CONSULTANT, will give "know-how" service to firm interested in German "Kollenguss" (brass gravity die casting process). Enquiries, directorship only considered, Box FT967, FOUNDRY TRADE JOURNAL.

ENERGETIC practical FOUNDRYMAN with six years' managerial experience cast iron, malleable and some non-ferrous, mechanised and jobbing, seeks position as customer-liaison officer. Box EP972, FOUNDRY TRADE JOURNAL.

FOUNDRY EXECUTIVE, 41, with personality and drive, seeks position Midlands. (Time served patternmaking and foundry apprenticeship.) Fully experienced all branches non-ferrous and grey-iron, works management, sales. Large business connections. Box FE952, FOUNDRY TRADE JOURNAL.

GENTLEMAN (55), General Manager, Director, Representative, many years, interested representative, good firm, foundry materials, technical process, casting supplies, liaison work, etc., car owner, Midlands area only, life experience trade. Box GG968, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER/SUPERINTENDENT requires situation, 17 years supervising capacity, grey and high duty irons, floor, bench, mechanised, green and dry sand, full control, sound practical experience. Box FM970, FOUNDRY TRADE JOURNAL.

FOUNDRY FOREMAN (42) desires change with prospects of advancement. 12 years foreman in ferrous, mechanised and jobbing, control of sand, cores and cupola, and all estimates. Box FF963, FOUNDRY TRADE JOURNAL.

YOUNG MAN—live wire—wants more lucrative position. Now earning £1,800 p.a. as Foundry Director. A.I.M., M.I.B.F. Box YM962, FOUNDRY TRADE JOURNAL.

GENERAL FOUNDRY MANAGER (54), ferrous, non-ferrous, jobbing, mechanised, practical, technical, all life trade, wants post immediately. Midlands. Box GF969, FOUNDRY TRADE JOURNAL.

TECHNICAL REPRESENTATIVE with extensive connection in London and Home Counties with large industrial groups wishes to represent a foundry for cast iron non-ferrous die castings, etc. Good personal connection, commission and part expenses. Box TR677, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

FOUNDRY FOREMAN for Brass & Aluminium Foundry, South Yorkshire. Must have practical knowledge and experience and able to produce high quality castings. Good prospects for right man. Apply stating age and experience to Box FF973, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*contd.*

AN opportunity exists for an experienced ESTIMATOR with Sheepbridge Alloy Castings Ltd., Hamilton Road, Sutton-in-Ashfield, Notts. Knowledge of foundry estimating would be advantageous. Please apply giving details of age, experience and salary required, etc., to PERSONNEL MANAGER.

TOP MEN

We have been retained to advise upon the following appointment

TECHNICAL MANAGER

Our clients are operating a modern Cast Iron Foundry, including Shell Moulding, on the outskirts of Birmingham.

Applications are invited from Foundry Technicians or Metallurgists who should be qualified in all branches of the technical side, i.e., metallurgy and foundry practice, including a complete knowledge of running and feeding of castings, and pattern making. In view of the development programme in hand this post offers greater scope and interest than usual. Candidates should possess a Higher National Certificate in Metallurgy, or its equivalent.

The appointment is permanent and pensionable. Salary will be by negotiation. Applications are treated as strictly confidential, and should be addressed to:—

H. JACKSON & PARTNERS LTD.

Management Consultants

109, COLMORE ROW, BIRMINGHAM 3.

SITUATIONS VACANT—*contd.*

REORGANISATION by a reputable firm of Ironfounders has created a vacancy for a first class experienced SALESMAN. Box RB957, FOUNDRY TRADE JOURNAL.

FOUNDRY Equipment Manufacturers require REPRESENTATIVE in Yorkshire. Please apply to Box FE941, FOUNDRY TRADE JOURNAL.

EXPERIENCED FLOOR MOULDERS wanted, good wages and bonus paid, overtime worked. Apply WALTER W. HOSKEN LTD., 62 Willow Walk, Bermondsey, S.E.1.

ASSISTANT PATTERN SHOP FOREMAN required for Midlands light repetition iron founders producing automobile and similar grey iron castings. Write in confidence stating experience, etc. Box AP946, FOUNDRY TRADE JOURNAL.

DRAUGHTSMEN required for Pattern Shop. Must be familiar with Mechanised Foundry methods and capable of laying out complete sets of equipment from component drawings and engineering instructions. Apply to: PREMO PATTERN CO. LTD., Edgbaston, Birmingham 15.

FOUNDRY MANAGER required for Pig Iron producing works to be responsible for make-up of charge, running plant and control of labour. Applicant must have metallurgical knowledge and be experienced in handling labour. Pension scheme in operation and assistance given with housing if required. Please write giving details of references, experience to date and age, to Box FM966, FOUNDRY TRADE JOURNAL.

TECHNICAL SALES REPRESENTATIVE required by high class Master Patternmakers located in the Home Counties. Adequate remuneration. Car provided. Box TS965, FOUNDRY TRADE JOURNAL.

DUE to promotion within the organisation, Sheepbridge Alloy Castings Ltd., Hamilton Road, Sutton-in-Ashfield, Notts., have a vacany for a REPRESENTATIVE to cover Scotland and the North Eastern counties selling iron, carbon steel and stainless steel castings. Please write giving details of past experience, salary required etc., to PERSONNEL MANAGER.

PRACTICAL MAINTENANCE ENGINEER, preferably with some administration experience, for small iron foundry in North Staffordshire. Interesting position with prospects for ambitious person willing to co-operate with Director on production planning, etc. Scope for travel if interested. We are NOT looking for a man who wishes to remain purely a maintenance engineer. Genuine applications only, in confidence, stating fullest details of experience. Box PM929, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*contd.*

AIC EXECUTIVE SELECTION DIVISION

Is advising on the following appointment

SALES DEVELOPMENT ENGINEER
(Midlands)

for a well established Foundry producing high quality light alloy castings, chiefly for the automobile, aircraft and electrical industries. He will be mainly responsible to the Sales Manager for assisting in diversifying the uses of such castings in these and other industries. Applicants should have suitable engineering background with foundry experience including selling/servicing to industrial users. Preferred age: 35 to 45 years. Initial salary up to £2,000 per annum with benefits. Promotion prospects would be commensurate with the success of sales development.
(Mr. W. J. Price: Reference 3927.)

Brief written applications should be sent, in complete confidence, to the Consultant concerned at:

ASSOCIATED INDUSTRIAL CONSULTANTS LIMITED
KNIGHTSBRIDGE HOUSE 197 KNIGHTSBRIDGE LONDON SW7

Associated Industrial Consultants

SKILLED MOULDERS, jobbing non-ferrous foundry, central Birmingham. Good piece rates. Box SM956, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER, with engineering background to be responsible for self-contained unit utilising both hand and mechanical casting of copper-base alloys. Details of experience with salary required to Box FM958, FOUNDRY TRADE JOURNAL.

FOUNDRY SUPERINTENDENT
C. & B. SMITH LIMITED

invite applications for the position of Foundry Superintendent for a mechanised grey iron foundry capable of producing 200 tons per week of castings up to 2 cwt. in weight.

The Foundry Superintendent will take full control and responsibility for production in all aspects, and have ample technical backing. He will be selected from the age group of 30-45 years, and should have already occupied a supervisory position with considerable responsibility in a mechanised foundry. Knowledge of green sand moulding, coremaking, and cupola operation should have been gained at first hand.

For the man selected the salary will prove to be attractive, and will be accompanied by normal superannuation benefits, and excellent opportunities for advancement.

Applications will be treated in strict confidence and should be addressed to the **GENERAL MANAGER AT STEWART STREET, WOLVERHAMPTON.**

FOUNDRY FOREMAN required for grey iron foundry using green sand and CO$_2$ process for producing plate and cored castings up to 10 cwt. Good prospects for young man with practical experience and good technical background. Preference given to applicant possessing National Foundry College Diploma. Apply PERSONNEL OFFICER, Thomas Potterton Limited (Member of the De La Rue Group), Emscote Road, Warwick.

EDUCATIONAL

COUNTY OF ESSEX EDUCATION COMMITTEE

BRAINTREE COLLEGE OF FURTHER EDUCATION

CHURCH LANE, BRAINTREE
Principal: H. E. HAMMOND, B.Sc. (Eng.), M.I.Mech.E., A.M.I.Prod.E.

BLOCK RELEASE COURSE IN FOUNDRY PRACTICE

APPLICATIONS are invited for admission to a Block Release Course in FOUNDRY PRACTICE AND TECHNOLOGY leading to the Ordinary and Advanced level certificates of the City and Guilds of London Institute. The course will be of two years' duration and students will attend full-time for three periods of five weeks each year.

There will be excellent facilities at the College; a new foundry is being erected and equipped for the course.

Students requiring accommodation in the area will be placed in approved lodgings at a reasonable charge.

Full particulars may be obtained on application to the PRINCIPAL.

AGENTS

SMALL West Midlands Grey Iron Foundry wishing to expand seeks AGENT to introduce repetition work, commission basis. Foundry capable of competitive prices and efficient deliveries. Box SW959, FOUNDRY TRADE JOURNAL.

AGENTS, calling on Ferrous and Non-ferrous Foundries, having experience in general foundry equipment and consumables, are required in several areas by FOUNDRY & METALLURGICAL EQUIPMENT CO., LTD., 161 Queens Road, Weybridge, Surrey. Please state clearly area covered.

PATENTS

THE proprietor of British Patents Nos. 711295 and 711339, both entitled "Mulling Apparatus" offers same for license or otherwise to ensure practical working in Great Britain. Inquiries to SINGER, STERN & CARLBERG, 140 So. Dearborn Street, Chicago 3, Illinois, U.S.A.

THE PROPRIETORS OF Patent No. 752673 for "Improvements in or relating to a Process and Apparatus for Desulphurising Pig Iron" desire to secure commercial exploitation by Licence or otherwise in the United Kingdom. Replies to Haseltine Lake & Co., 28, Southampton Buildings, Chancery Lane, London, W.C.2.

BUSINESS OPPORTUNITY

OWING TO

GENERAL REORGANISATION

and change of production emphasis a sizeable Group of Companies is considering closing down its own iron foundry. This will leave approximately **£250/£300,000 P.A.** of mainly repetition castings to be placed for outside customers and own use.

Necessary plant, boxes and other equipment are available for removal and probably some key labour if desired.

All propositions submitted in writing will be considered.—BOX OT255.

MACHINERY WANTED

Cleveland Plant and Machinery Co., Ltd.,

want your

Surplus Foundry Plant and Forging Equipment

Best prices given

Wharncliffe House
44 Bank Street
Sheffield, 1
Tel. No. 29051

MACHINERY WANTED—*contd.*

WADKIN Universal Wood Miller required. Please send details to Box WU950, FOUNDRY TRADE JOURNAL.

BAG TYPE Dust Collector, approx. 7 ft. × 11 ft. Ladle Hoist, ½-ton cap. Roper preferred. Box BT971, FOUNDRY TRADE JOURNAL.

5 FT. or 6 ft. Sand Mixer. Must be in good working order, with or without skip hoist. Also all types British Moulding Machines. Send full details to: JAS. EVANS & Co. LTD., Cross St., Salford 3, Lancs. Tel. Blackfriars 2297.

REQUIRED urgently, either gas or coke fired thermostatically controlled continuous core stove with a tray size of not less than 3 ft. × 1 ft. 3 in. State condition and price.

HENRY ROBINSON (Ironfounders) LTD.
Stewkins Foundry,
Nr. Stourbridge, Worcs.

WANTED. Modern 24 in. or 30 in. D/E Grinder complete with Dust Extractor. Also 5, 10 or 15 ton, 400 volt A.C. O/H Travelling Crane, 42 ft. span or larger. Box WM960, FOUNDRY TRADE JOURNAL.

MACHINERY FOR SALE

600

ELECTRICALLY DRIVEN AIR COMPRESSORS, MOTORISED 400/3/50 WITH CONTROL GEAR

TWO 100 c.f.m. Reavell single stage 100 p.s.i., 720 r.p.m.
ONE 169 c.f.m. Ingersoll-Rand two stage 100 p.s.i., 970 r.p.m.
ONE 380 c.f.m. Reavell Quadruplex single stage 120 p.s.i., 580 r.p.m.

GEORGE COHEN
SONS & CO., LTD.,
WOOD LANE, LONDON, W.12
Tel.: Shepherds Bush 2070.

LEES HALL ½ ton Oil Fired ROTARY FURNACE for Aluminium Smelting. Good condition. Can be inspected at E. J. HARRISON LTD., Edmar Works, Mill Green Road, Mitcham, Surrey. MIT 1881.

MACHINERY FOR SALE—*contd.*

FOR SALE. Morris 37 ft. 4 in. Soan two Girder type 2 ton capacity cab operated overhead travelling crane in first class condition. Apply: FRANK SALT & Co. LTD., Station Road, Blackheath. Phone: BLA 1635.

BROOM WADE Air Compressor, 150 c.f.m. and 45 lb. sq. in. pressure complete with water pump and receiver, 6 ft. × 2 ft. Nearly new condition. £130.
Broom Wade E.P.660 Compressor, 100 c.f.m. at 100 p.s.i. £90.
Two Pneulec Pneumatic Jolt Squeeze Moulding Machines for boxes, 14 in. × 14 in. £50 pair.
B.M.M. R.D.5 Moulding Rollover machine table, 48 in. × 30 in. £295.
Coleman Pneumatic Jolt Squeeze Moulding Machinery, suitable 12 in. wide boxes, working order. £20.
Belt take off Sand Hopper, 3 ton capacity, 6 ft. 6 in. h. 4 ft. w. 7 ft. 1 in. complete motor and reduction gear. £260.
30 ton per hour Sand Elevator, 27 ft. belt centres complete with Coleman Aerator unit. Nearly new rubber belt complete with motor and reduction gears. £325.
30 ton per hour belt conveyor, 16 ft. × 2 ft., good belt with reduction gear and motor. £90.
Pneulec Sand Spinner D.C. Gift. £10.
Four Pneumatic Sand Rammers. £4 each.
Sinex Shakeout beam, ½ ton capacity, little used. £35.
Redford Core Blower—2 cartridges. £40.
Roper 10 cwt. racking hoist with 5 cwt. ladle and trolley. £50.
Core Oven Double Door, 6 ft. × 4 ft. × 2 ft. £5.
Five nearly new 1 ton Lifting Beams. £3 each.
1 ton large box cramps box pins and hooks. £25.
Two 20 ton Geared Winches 48: one reduction with foot brake. One new original cost £350 each. £50 each.
14 h.p. Brush 3 speed motor—400/3/50—725, 960, 1,400 r.p.m. with starter. £45.
7½ h.p. B.T.H. geared reduction motor, 1,450/75 r.p.m. 400/3/50. £45.
Fifty other motors. 30s. per h.p.
St. George dust extractor with fan, 3 ft. × 3 ft. × 9 ft., good order. £35.
B.M.M. Core Rollover type V804 BA. £180.
Nine Pneumatic Rollover core stripping machines. £50 each.
Large selection of core blowers by Coleman & August, extremely cheap to clear.
Small rumbler approximately 4 ft. × 18 in. £50.
Small Fordath Sand Dryer—good condition. £65.
Two large gitting cutters (horizontal band saws) 36 in., 2 ton rotary receiver on base, complete with gearing. £75.
All prices ex works F.O.L.

LAWFORD PLANT & MACHINERY LTD.
Manningtree 365

MACHINERY FOR SALE—*contd.*

SAND MIXERS and DISINTEGRATORS for Foundry and Quarry: capacities from 10 cwts. to 10 tons per hr.—W. & A. E. BREALEY (MACHINERY), LTD., Misterton, nr. Doncaster. Tel.: Misterton 202.

W.M.P.
offer
LOW TENSION SWITCHGEAR
GEORGE ELLISON

3-panel board, main 600 amps.
2 outgoing switches.
4-panel board, main 600 amps.
3 outgoing switches, 150 amps.
C/W instruments.

REYROLLE

6-panel board, main 800/600 amps.
5 outgoing 200/150 amps. Type H.A. Airbreak. T.P. & N. instruments.

CROMPTON PARKINSON "KLAD"

4-panel board, main 1,000/800 amps.
3 outgoing switches, 300-200-150 amps.
C/W isolators, instruments, etc.

GEORGE ELLISON

700/500 amp. T.P. & N. C/breaker.
700/600 amp. T.P. & N. C/breaker.

METROPOLITAN-VICKERS

4-panel metal clad board, airbreak.
T.P. HRC switch fuse units, 400 amps., and three 200/150 amps.

GEORGE ELLISON

Bantam Circuit Breakers.

WHITEFIELD MACHINERY & PLANT, LTD.
48, CHATHAM STREET, EDGELEY, STOCKPORT.
Stockport 4471

SHOTBLAST MACHINES

All sizes Rooms or Cabinets. Ex stock or prompt delivery. Low prices.

Try us for

Spare parts & tungsten carbide nozzles.

Fully illustrated Catalogue free on request

Actual Manufacturers

ELECTROGENERATORS LTD.
AUSTRALIA ROAD, SLOUGH
Telephone: SLOUGH 22877
49 years of satisfactory service

CUPOLA PLANTS
SPARK ARRESTERS
CHARGING MACHINES
CONVERTORS

H. BECK & SON LTD.
WEST LANE, . . KEIGHLEY.

GEARED & UNGEARED LADLES
FROM
28 lb: CAP:
TO 30 TON CAP:

PHONE: KEIGHLEY 4132

ROLLED STEEL MOULD BOXES
WHEEL BARROWS
LADLE HOISTS AND LADLES

AGENTS

SCOTLAND	MIDLANDS	WALES	SOUTH
GEO. SMART & CO. GLASGOW CENTRAL 7819	H. R. HARRIS BIRMINGHAM SOUTH 1360	J. HUTCHINSON CARDIFF 23832	J. C. MACINLAYS MITCHAM 4153

MACHINERY FOR SALE—*contd.*

HALL modern Electric Industrial Refrigeration Plant. 350,000 B.T.U.'s. Very reasonable.

BROOMWADE 150 c.f.m. Industrial Twin Compressor Plant, complete 440/3/50 motor, large receiver, etc. (D22A.) £255.

2,000 deg. Electric Toolroom Furnace, 36 in. × 14 in. × 16½ in., almost new. Pyrometer etc. Weight balanced door. £145.

ASQUITH 3 ft. Radial A1-geared Drilling Machine. Base and box tables. Power elevated. £255.

LUKE & SPENCER High Speed Fettling Grinder. Duplex 24 in. wheels. 400/3/50 motor in base. Auto speed control. £255. Hydraulic Edge Grinder. Table 66 in. × 12 in.—440/3/50 motor and equipment. Offers.

Box HM964, FOUNDRY TRADE JOURNAL.

TWW

9 FT. Radius Sand Slinger by Foundry Plant & Machinery, three motors 400/3/50.

Linslade No. 1 Sand Slinger, 10 ft. radius, two motors 400/3/50.

Collin 10 tons Geared Foundry Crane Ladle.

New Geared Crane Ladle 10 cwt. to 5 ton cap.

B.M.M. Moulding Machines:
HPL1 Jolt Squeeze Pattern Draw, 26 in. × 18 in.
HPL3 Jolt Squeeze Pattern Draw, 36 in. × 25 in.
RD5 Jolt Squeeze Turnover, 48 in. × 30 in.
BT5 Jolt Squeeze Turnover, 36 in. × 28 in.

Coleman Wallwork Jolt Squeeze Straight Draw Moulding Machines:
WT563C, table 35 in. × 24 in.
WT563, table 22½ in. × 19 in.

Self contained Coke fired Oven, two compartments each 18⅝ in. wide × 52 in. high × 36 in. 6/f.

Vibratory Sand Riddles, 22 in. dia., 400/3/50, with tripod.

August No. 3 Motor driven Sand Mill, 8 ft. dia. pan, 12/15 tons hour cap. 400/3/50.

One Major Sand Rammer by Foundry Equipment Ltd. complete with vertical skip loader and electric hoist.

Also Air Compressor, all sizes, new and secondhand, Cupola Blowing and Extractor Fans, Shot Blast Equipment, etc.

Our stocks are constantly changing. Please send us your enquiries.

THOS. W. WARD LTD.
BRETTENHAM HOUSE, STRAND, LONDON, W.C.2.
'Phone TEMple Bar 1515 (12 lines)

Remember · Words might have it!

Roper LADLES
STOCK UP TO 5TON CAP.
E. A. ROPER & CO. LTD.
KEIGHLEY • Phone: 4215-6

MACHINERY FOR SALE—*contd.*

TWO Macnab size "A" Jolt Squeeze Pneumatic Moulding Machines for sale in good condition. G. B. PARKES LTD., Crown Works, Halesowen, Nr. Birmingham.

ONE Elevated Slag or Refuse Hopper, capacity approximately 20/25 tons, of steel construction, providing a Gravity Discharge to vehicle. Electrically operated loading bucket is fitted. In very good condition. To be sold on site. Inspection by appointment. BAMFORDS, LIMITED, Uttoxeter, Staffs.

ETHER Combined Temperature Indicators and Regulators, zero/1,000 deg. C. Six Instruments.

ETHER Combined Indicator and Chart Recorder, zero/1,000 deg. C. Two Instruments.

TWO G.E.C. Photo Cell Equipments comprising Projector type LLH, Control Relay type A, and Photo Equipment, type MD.

TWO Process Timers by Burrell, Sheffield, zero/30 seconds.

FIVE ETHER type 680 "Throttltrol" Control Units.

SIX McLAREN Protective Thermostats, 250/1/60. 5 amperes, 200/760 deg. C.

ALL ABOVE SECOND-HAND, UNUSED.

WHITEFIELD MACHINERY & PLANT LTD.
48 Chatham Street, Edgeley, Stockport, Cheshire.

MOULDING MACHINES:

B.M.M. Type RDO. Table 26 in. × 18 in.
B.M.M. Type AT5. Table 36 in. × 25 in.
B.M.M. Type AT4. Table 30 in. × 21 in.
B.M.M. Type TO3, hand sq. t/over, table 30 in. × 20 in.
B.M.M. Airdraulic t/over Strippers.
OSBORN 704L. Jolt Squeeze Strippers.
Hilton Hand Press Pin Lift, No. 5.
ADAPTABLES: large sizes.

CORE STOVES:

Silas Hyde gas-fired, 4 × 3 × 6 ft. high.
Silas Hyde gas-fired, 3 × 3 × 6 ft. high.
Gas-fired, 5 ft. × 4 ft. × 6 ft. high.

MOULDING BOX KNOCKOUT:

"Sherwen" 5 ft. 6 in. × 8 ft., 3/50/400 V.

For ALL TYPES of FOUNDRY PLANT AND MACHINERY

S. C. BILSBY & CO.
Hainge Road, Tividale, Staffs.
TIPton 2448
(Established over 40 years)

Abrasive Cutting-off Machine, motorised as new.
5ft. Jackman Sand Mill. Modern ball bearing machine. As new. £230.
Titan Coreblower. 75 lb. capacity. Almost new.
Abrasive Development Aqua-Spray wet type blast machine. Almost new.
Large and standard size Adaptable Moulding machines.
Modern Rumbling barrel 6ft. by 3ft.
Large stock of geared ladles up to 8 tons capacity. List on request.
Few Roper ladles and Roper ladle hoists, 3- and 5-cwt. capacity.
New Bale-out and Lift-out Furnaces. Please send for illustrated leaflets.
Monometer 800lb. aluminium capacity Rotary furnace.
Large stock of small Moulding Boxes at low prices to clear. List on request.
Several Cummings Coke fired furnaces.
Cummings oil sand mixer.
Two Pneulec jolt squeeze Moulding machines.
200 assorted Keith Blackman Fans.
Lathe, 5in. all geared head. £50.

ELECTROGENERATORS LTD.
Australia Road, Slough, Bucks.
Tel.: Slough 22877 & 22094

MATERIALS WANTED

WANTED
SCRAP ELECTRODE CARBONS GRAPHITE-OFFCUTS
details of tonnages and samples to
FINE GRINDING LTD
Blackhole Mine, Eyam, Derbys.
Phone: Eyam 227

WANTED URGENTLY

Discarded Sacks,
Slag Bags,
Old Sacking.

For good prices and prompt settlement sell to actual users.

JOHN COTTON
(JUTE) LTD.
NUNBROOK MILLS
MIRFIELD · YORKSHIRE
Tel: Mirfield 3306-7

MATERIALS FOR SALE

pulverite

COAL DUST
lowest in ash

The STANDARD PULVERISED FUEL Co. Ltd
Head Office
47 VICTORIA STREET, WESTMINSTER
LONDON, S.W.1 TEL: ABBey 6255/6

MANY leading Foundries now using HOP MANURE for greater economy. Regular supplies delivered by road. Quotations on request. SMALLMAN'S, Oakham Road, Dudley. Phone Dudley 52818.

PROCESSED FOUNDRY MANURE. Higher permeability, greater strength, lower cost, cleaner castings, pest-free and odourless. Now used by more than 100 leading foundries and engineering works. 24-hour delivery service, 150 miles radius of Birmingham. GINSTER BROS., Walsall. Tel. 27367.

MISCELLANEOUS

FIREWOOD for Cupolas, Sleepers and Sleeper Wood in wagon loads.—TRACK SUPPLIES & SERVICES LTD., Haversham Bank Sidings, Wolverton, Bucks.

CASTING WEIGHTS estimated from customer's drawings. Prompt postal service, nationwide coverage. W.E. & Co., 35, Marlborough Road, Accrington, Lancashire.

CAPACITY AVAILABLE

CASTINGS.—We can save your porous castings, ferrous or non-ferrous, by an approved impregnation process; sample castings treated. A.I.D. approved.—RECUPERO, LTD., 66, South Harrow Viaduct, Harrow, Middlesex. 'Phone: Byron 1178.

FOR successful castings from your plant. Pressurecast matchplates, precision wood or metal pattern equipment can be purchased quickly, competitively, from BOOTH BROS. ENGINEERING, Baggrave Street, Leicester. Tel. 67020.

HEAT TREATMENT of Iron and Steel. Annealing, Normalising, Stress Relieving and Shotblasting. Prompt delivery by our own transport. THE RUSTLESS IRON CO., LTD., Trico Works, Keighley. Tel. Keighley 3737.

CAPPACITY available for Iron and Non-ferrous castings, machine and floor moulding, grades 17 and 14. Specialise in repetition work. High quality, competitive prices, good delivery.

WATFORD FOUNDRY CO. LTD.,
By-pass Road, Watford
Tel.: WA 25677

CAPACITY AVAILABLE—contd.

CAPACITY available for Iron and Steel Castings. Sand and Shell Moulding pattern making capacity. Enquiries invited: KNETE CASTINGS, LTD., Station Road, West Horndon, Essex.

WOBURN ENGINEERING LIMITED, Woburn, near Bletchley, Bucks, offer the facilities of their Machine Shop, three miles off the M.1. Capacity available for Universal Grinding, centre and capstan lathes, milling and shaping machines. Telephone: Woburn 628/9.

VITREOUS ENAMELLING.—Capacity available for enamelling castings in all finishes (plain, mottle, marble, lustre, etc.). Prompt delivery by our own transport. THE RUSTLESS IRON CO. LTD., Trico Works, Keighley, Yorks. Tel.: Keighley 3737.

Phone: Hockley (Essex) 337
HOCKLEY FOUNDRY CO. LTD.
HOCKLEY, ESSEX
for first class
CYLINDER-IRON CASTINGS BY SHELL & ALL MODERN PROCESSES
Quick & reliable delivery
London Address: 5 Osbert Street, Westminster, S.W.1.
Telephone : Victoria 7486

PATTERNMAKERS

PATTERNS for all branches of Engineering for Hand and Machine Moulding.—FURNESTON & LAWLOR, LTD., Letchworth.

HENRY CLUETT & CO., LTD.—Patterns of all types in Wood, Metal and Epoxy Resin. Quotations by return. Quick delivery. Furlong Road, Tunstall, Stoke-on-Trent. Tel. 87822.

PATTERNMAKERS
(Engineering) CO. LTD.
Shrewsbury Road, London, N.W.10
PATTERNS
CASTINGS
Phone : ELGAR 8031/2

PATTERNS WOOD AND METAL
CAPACITY FOR WADKIN PATTERN MILLER
GOOD DELIVERIES
ELLIOTT MUSGRAVE, LTD.,
LONGSIDE LANE, BRADFORD 7
Telephone: BRADFORD 24464

THE
KERR PATTERN CO. LTD
ALL TYPES OF PATTERNS
ROSEMARY LANE, LINCOLN
TELEPHONE: LINCOLN 241

J. H. MAY LTD.

117, CENTRAL STREET, LONDON, E.C.1

Are moving to NEW Premises on 1ST. Oct. 1961

at

15-20, THE OVAL
HACKNEY RD., BETHNAL GREEN, LONDON, E.2

Telephone:
SHOREDITCH
7923
(2 lines)

BRANCH WORKS STILL AT—
CROWN WHARF, DACE ROAD, OLD FORD, E.3
Tel: AMHurst 3411

PATTERN MAKERS

WOOD — RESIN — METAL
PLATE OR LOOSE PATTERNS, MODELS, ETC.

B. LEVY & COMPANY (PATTERNS) LIMITED

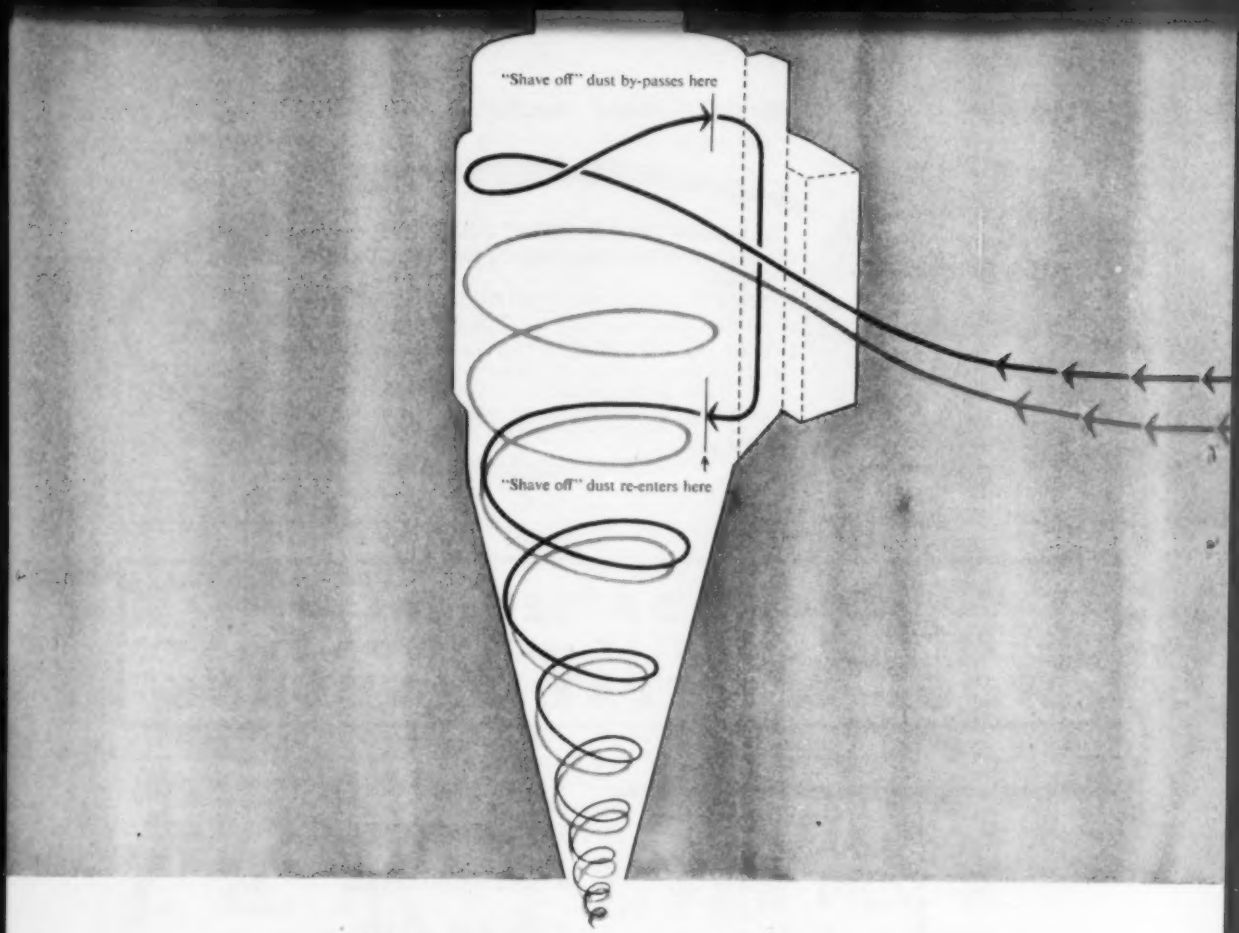
FULLY-MACHINED METAL PATTERNS, coreboxes, core-driers and setting-jigs for SHELL-MOULDING and machines.
WOODEN PATTERN EQUIPMENT of all sizes and types for loose-pattern and plate moulding.
EPOXY RESIN MULTIPLES and replacement equipment. (Plastic Patterns)
KEEN QUOTATIONS RELIABLE DELIVERIES
B. LEVY & CO. (PATTERNS) LTD., 1-5 OSBERT STREET, LONDON, S.W.1
TELEPHONE : VICTORIA 1073 or 7486

STOKE-ON-TRENT 22627
COOKE BAILEY Ltd.
MORLEY ST., HANLEY STOKE-ON-TRENT
WOOD & METAL PATTERNS

J. G. GREGORY & SON LTD.,
Sole U.K. Agent for the sale of
PURE GREENLAND CRYOLITE
TALKE · STOKE-ON-TRENT · STAFFORDSHIRE
Telephone Kidsgrove 2031 (3 lines)

- **Fluorspar**
- **Limestone**
- **Bone Ash**
- **Graded Sands**
- **Terra Flake (Talc)**

H. J. DOWLER (ENGINEERS' PATTERN MAKERS) LTD.
WOOD AND METAL PATTERNS. HYDRAULIC DUPLICATING.
PATTERNS FOR SHELL MOULDING. EPOXY RESIN PATTERNS.
GRAVITY DIES.
147 GRANVILLE STREET, BIRMINGHAM 1
MID 0649



Follow the black line to see just one reason why we can guarantee the efficiency of every Ambuco Cyclone installation

The AMBUCO method of guaranteed efficiency offers you the following unique advantages:

1. **We analyse** the size, shape, porosity, density, specific gravity, acceleration, etc. of particles and gases to be separated.
2. **We set up fractional efficiency curves** to determine the type of cyclone best fitted to deal with the conditions in your works. This means that every user of AMBUCO "guaranteed efficiency" cyclones can be quite certain of the performance of his dust recovery system *before* an order is placed.
3. **The "shave off"** achieves considerable improvement in the rate of recovery because the dust caught in the "double eddy" current is forced through the "shave off" port (see illustration) and conducted through a by-pass duct into the main volume of dust.

Dust control is our sole concern. Our engineering and design service is fully equipped to deal with all dust control and recovery problems employing cyclones, scrubbers, grit arresters, fabric dust collectors and other equipment.

You can see working models of the Ambuco "guaranteed efficiency" Cyclone and the Ambuco Venturi Scrubber at the HEVAC Exhibition at Olympia from 26th September to 6th October.

For technical literature on the Ambuco Cyclones please ring HYDe Park 2178 or write to AMBUCO LIMITED, Standbrook House, 2/5 Old Bond Street, London, W.1.

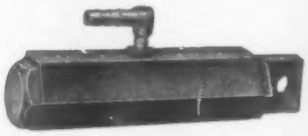
AMBUCO put dust in its place

A Member of the Gold Fields Mining & Industrial Group

ring HYDe Park 2178

THE "EXPRESS" PNEUMATIC VIBRATOR

Available in two sizes:
1" bore 45/-
1½" .. 70/-



"EXPRESS" Vibrators eliminate battered plates—save time and money.

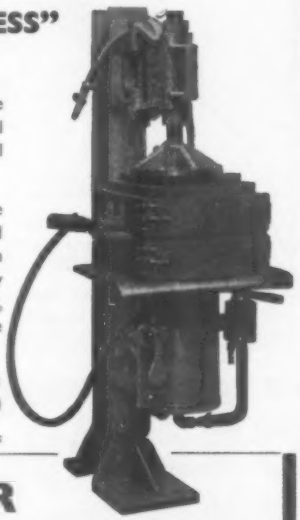
THE "EXPRESS" SQUEEZER

Unrivalled for the cheap and rapid production of small castings.

Founders using the "Express" and squeezing both parts simultaneously produce 200-300% faster than on the bench or stump.

PRICE £85

Complete with accessories



FISHER FOUNDRIES LTD.

ALBION ROAD, GREET, BIRMINGHAM
Telephone: VICtoria 0197

Quality ingots

Speedy and efficient handling gives you a really first class delivery on all types of metal ingots. Years of experience in the manufacture of ingots, plus the knowledge of our customers particular requirements enables us to meet any individual demand.

HENEAGE INGOTS

IN BRASS, GUN METAL & PHOSPHOR-BRONZE

HENEAGE METALS LTD.

Heneage Street, Birmingham 7.
Telephone ASTon Cross 1177/8.

JAS. EVANS & CO. LTD.

EVERYTHING FOR THE FOUNDRY

CUPOLAS	MOULDING BOXES
WET & DRY SPARK ARRESTORS	STUDS AND CHAPLETS
LADLES	BRUSHES
SAND MIXING PLANT	RIDDLES AND SIEVES
SAND DRIERS	SPRIGS AND NAILS
BARROWS	PLUMBAGO

BRITANNIA WORKS, CROSS ST., SALFORD, 3, Lancs

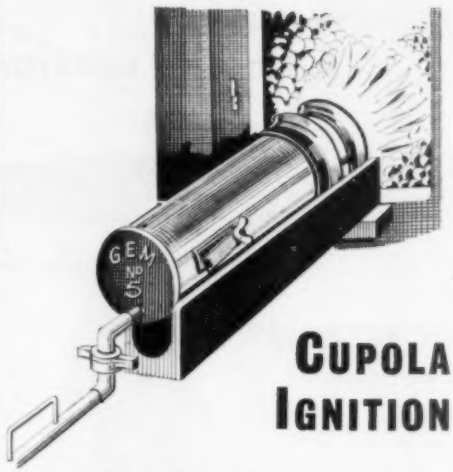
Industrial Health Technology

B. Harvey and R. Murray

333 pages · Price 45s.

The ever-growing list of chemical compounds and new technical processes used in the expanding industrial field makes it essential for factory managements to have a ready means of reference to possible causes of industrial ill-health and disease, and their prevention. This work, written by an engineer and a doctor, brings together both sides of the subject and establishes certain fundamental principles which can be the basis of future precautionary measures, with particular reference to ventilation and allied topics.

Butterworths
4 · 5 Bell Yard, W.C.2.



CUPOLA IGNITION

CHEAP · QUICK · CLEAN

WRITE FOR DETAILS TO :—

WOODWARD BROS. & COPELIN, LTD
Lime Tree Road, Matlock, Derbyshire
Tel: Matlock 3055

SHELL MOULDED CASTINGS

MAY BE YOUR BUSINESS

PATTERNS FOR SHELL MOULDING ARE OURS

G. & J. HOLT (ROCHDALE) LTD.
RIVER STREET · ROCHDALE
Telephone 2423

TWIN 4 H.P. MOTOR TWO SPEED GRINDING MACHINE

Designed to enable the correct periphery cutting speed to be maintained, and allow each wheel to operate independently, thus one wheel only need be used or alternatively both wheels can be used at different speeds simultaneously.

Size of Grinding Wheels	—	20" × 3" × 7"
Speed of Motors	—	1400 r.p.m.
Speed of Spindles	—	1100 & 1250 r.p.m.
Distance between wheel centres	—	5' 0".
H.P. of Motors (2)	—	4.

SAFETY DEVICE TO PREVENT HIGH SPEED BEING ENGAGED WITH A NEW WHEEL

20" MODEL

illustrated fitted with B.C.I.R.A. Hoods.

Also manufacturers of 10" 12" 14" and 16" Grinders and 9" Power Hacksawing Machine.

MADE IN ENGLAND

CABLES NILMACH · LONDON

NORTON INDUSTRIES LTD.

SALES DIVISION · STAFFORD HOUSE · NORFOLK ST · STRAND · LONDON WC2

Telephone TEMple Bar 0681

GRAMS NILMACH · ESTRAND LONDON

PLUMBAGO

here's proof -

it PAYS to buy the best!

- ✓ 1 lb. of Plumbago is quite capable of producing castings worth £50.
- ✓ X Special costs 2d. a lb. more than an "average" Plumbago— **only 2d. on £50!**
- ✓ but the saving in fettling can exceed **the entire cost** of such a Plumbago.
- ✓ proving that X Special is the cheapest grade as well as being the best.
- ✓ **and** will enhance your reputation for sound, clean castings.

WILLIAM CUMMING & Co LTD

Kelvinvale Mills	Whittington Mills	Deepfields Works	Sunnyside Mills
GLASGOW, N.W.	CHESTERFIELD	BILSTON	FALKIRK
Maryhill 1033	5314	41203	161

Industrial Health Technology

B. Harvey and R. Murray

333 pages Price 45s.

The ever-growing list of chemical compounds and new technical processes used in the expanding industrial field makes it essential for factory managements to have a ready means of reference to possible causes of industrial ill-health and disease, and [illegible]. This work, written [illegible] doctor, brings to[illegible] subject and esta[illegible] principles which[illegible] precautionary [illegible] reference to vent[illegible]

Butterw[illegible]
4 · 5 Bell Ya[illegible]

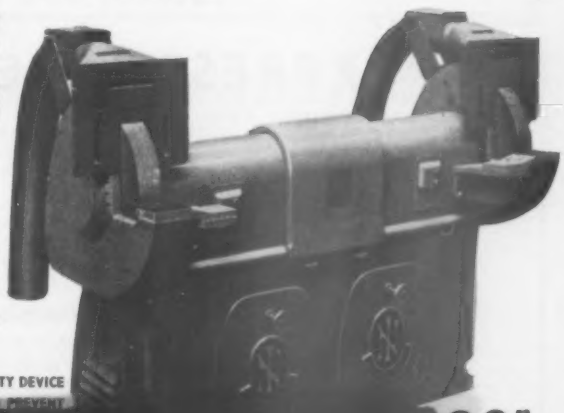
M[illegible]
C[illegible]

PATT[illegible]

WAVY

TWIN 4 H.P. MOTOR TWO SPEED GRINDING MACHINE

Designed to enable the correct periphery cutting speed to be maintained, and allow each wheel to operate independently, thus one wheel only need be used or alternatively both wheels can be used at different speeds simultaneously.



Size of Grinding Wheels —	20" × 3" × 7"

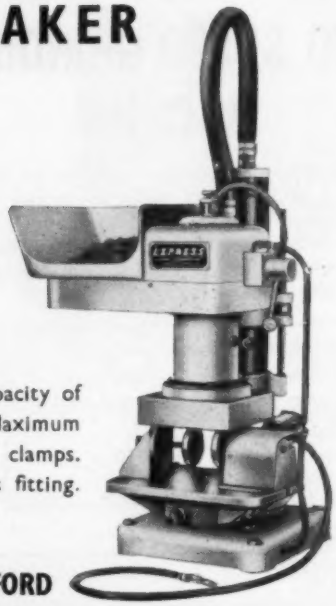
SAFETY DEVICE TO PREVENT

20"
MODEL
Hoods.
and 9"
GRAMS
CH · ESTRAND
LONDON
gs worth
mbago—
t of such
as being
castings.
O LTD
nyside Mills
FALKIRK

PAGES

The EXPRESS COREMAKER

Adjustable air control
Simple and quick height adjustment
Extreme accessibility
Fitted with silencer
Quickest possible action

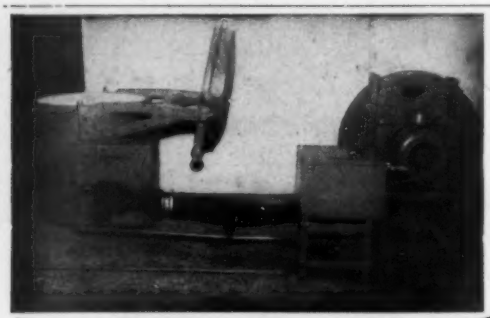


For anyone requiring a quick acting and reliable core blower at a very reasonable price, then this is the machine.

Sand capacity of blow head—11 lbs. Maximum capacity of core which can be blown at one charge—9 lbs. Maximum corebox dimensions 15 ins. high. 9 ins. between clamps. Air pressure regd. 80 lbs. Air supply 1¼ ins. gas fitting. Overall height 54 ins. Weight 544 lbs.

STERLING FOUNDRY SPECIALTIES LTD., BEDFORD

Cogent



Oil-Fired CRUCIBLE FURNACE

200lb. Copper Melting Capacity

Please send for details to:

NORRIS EQUIPMENT & CONSTRUCTION LIMITED
58 QUEENS ROAD · BRISTOL 8
TELEPHONE BRISTOL 36817

If you require a service
for
PROMPT, RELIABLE, ECONOMICAL
METALLURGICAL ANALYSES
CONTACT
Joseph Lones Laboratories
(Established 1890)
METALLURGICAL CHEMISTS & SAMPLERS
Approved by A.I.D., London Metal Exchange, etc.
41 VICARAGE RD., SMETHWICK 41 (near BIRMINGHAM)
Telephone: SMEthwick 2601/2

COKE

FOR ALL PURPOSES

CAWOOD WHARTON & CO. LTD.

"SOUTHLANDS" HARROGATE.
Tel. Harrogate 6868

ST. MARTIN'S HOUSE, LONDON, S.E.18
Tel. Woolwich 5232

'STONE'S METALS'

During the last 75 years STONES have played a leading part in the development and application all over the world of high tensile brasses, nickel aluminium bronzes and whitemetals. To-day we have pleasure in introducing our entirely new and outstandingly successful SUPERSTON range of super-strength copper base alloys.

If you require the highest possible quality and the certainty that a complete metallurgical advisory service will always be at your service, please send your enquiries to us. No quantity or problem is too small or too large.

BRONZE ingot and forging billet

Manganese bronze
Nickel aluminium bronze
Gear wheel bronze
Chromium bronze
Lead bronze
Tin bronze
Gun metal

WHITEMETAL ingot

Dsyl
Underwater
Main bearing
Railway
Auto

Linings by Lagersmit process

SUPERSTON alloys

Extruded bar
Forgings
Welding wire
Electrodes

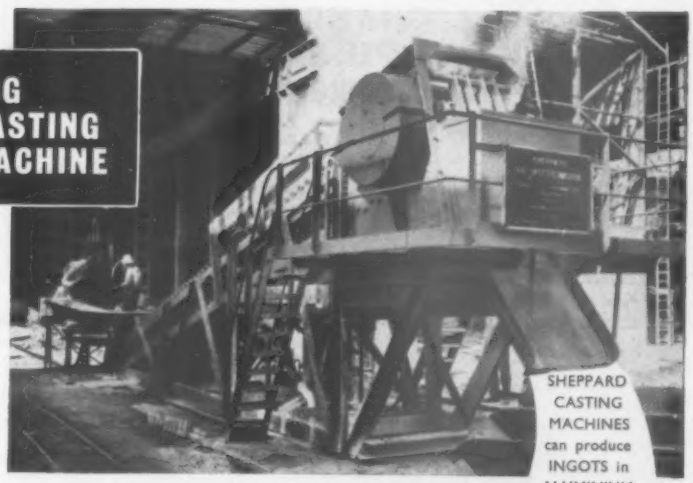
Castings from our licensees

S.M.E.

STONE MARINE ENGINEERING CO. LTD.
Woolwich Road, Charlton, London, S.E.7.
ON THE APPROVED LIST OF ADMIRALTY AND A.I.D.

SHEPPARD PIG CASTING MACHINE

Standard equipment for medium capacity pig iron production. Sheppard Pig Casting Machines can be supplied as single, or double strain units with capacities ranging up to 100 tons per hour.



SHEPPARD CASTING MACHINES can produce INGOTS in ALUMINIUM BRASS · BRONZE GUNMETAL · LEAD COPPER · ZINC REFINED & PIG IRONS

SHEPPARD'S of Bridgend

SHEPPARD & SONS LTD · BRIDGEND · GLAMORGAN
Telephone: Bridgend 3201

Behind all ESCO Products...

Esco Products include:—
Tandem White Metals and Bearings complete or relined.
Gun Metal & Phosphor Bronze Chill Cast Rods and Ingots.
T.C.C Continuous Cast Rods.
Rotocast Bronze Bushes and Blanks.

* *Send for booklet 'the lining of bearings', and technical Data sheets*

THE **EYRE** SMELTING COMPANY LTD

TANDEM WORKS, MERTON ABBEY, S.W.19 · Telephone MITCHAM 2031

DIAMOND SUPER-RAPID CRUCIBLES

Special glazing

THE WILSON CRUCIBLE CO. LTD.
16 PHILPOT LANE, LONDON E.C.3
Tel. MAN 8138/9

Telegraphic Address:
CRUCIGRAPH, LONDON

Wm. REID & Co.

PATTERNMAKERS

full facilities available for precision patternmaking for hand and machine moulding.
Keen Prices—Prompt Delivery.

Phone SOUth 0075 or write :—

Wm. REID & Co., Cardwell Street, Glasgow, C.5

ENGLAND'S MOST EFFICIENT
ZINC MELTER AS USED BY ALL LEADING ZINC DIE-CASTERS

Specially designed range of Zinc Melting Furnaces, tangentially fired by single forced draught gas or oil burner. Fitted special type flanged heat-resisting iron crucible, and if required, arranged with automatic temperature control to ensure exacting results at all times, without the use of skilled labour. Illustration shows gas fired Furnace one-ton Zinc capacity. Automatically gas fired. Capacities from 100 lbs. up to 4,000 lbs. Central or Lip Axis Tilting arranged when required, for the feeding of further bale-outs, or direct by shute into die-casting machines. Also manufacturers of Furnaces for Aluminium, Brass, and all non-ferrous metals.

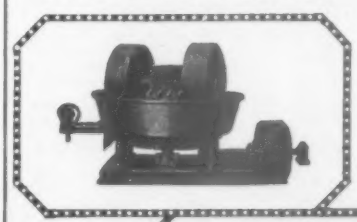
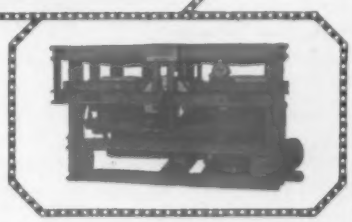
LEES HALL & SONS LIMITED
DENTON CORNER, NEWHAVEN, SUSSEX
Telephone: 414

AAF ROTOCLONE* DUST COLLECTORS . FOR BETTER DUST CONTROL

AIR CONTROL INSTALLATIONS LIMITED
RUISLIP · MIDDLESEX · VIKing 1222
* Regd. Trade Mark. Made in Great Britain by Air Control Installations under licence from American Air Filter Co., Inc.

ALBERT SMITH & CO.
60, St. Enoch Square
Phone: Central 5909 GLASGOW, C.1 'Grams: Thrower, Glasgow
FOR COMPLETE FOUNDRY PLANT SERVICE TOOLS FURNISHINGS
EVERYTHING FOR THE FOUNDRY

THE BRITISH SHOTBLAST & ENGINEERING CO. LTD.
STRETFORD LANCS. ENG.
PHONE: LONGFORD 1187
THE VERY LATEST IN SHOTBLAST EQUIPMENT & DUST ARRESTERS
NEW TYPE SHOTBLAST HELMETS IN MOULDED RUBBER, PRACTICALLY INDESTRUCTIBLE
PATENT NO. 861167
WRITE NOW FOR PARTICULARS AND PRICES.

TRADE Smedley MARK
SAND TREATING MILLS

BATCH MILL 1 to 20 cwts. per charge
CONTINUOUS MILL 5 to 40 tons per hour
Revolving or Stationary PANS Over or under-driven

Smedley Brothers, Ltd. Belper. Derbyshire.
Telephone: Belper 12

BLACK SEAM AND HISEGAR REFRACTORIES
Linings, Patchings, Cements, Ground Fireclay, Firebricks, Foundry Sands and Compo.
BLACK SEAM preheated downdraught CRUCIBLE FURNACES
Coke, Oil or Gas Fired
Free demonstrations at your works
MIDLAND MONOLITHIC FURNACE LINING COMPANY LIMITED
GOOSE LANE, BARWELL, LEICESTER Tel. Earl Shilton 2061/2 (2 lines)

FOR GRAVITY DIES
R. E. Ormerod Ltd
EDNALL LANE, BROMSGROVE, Worcs.
Telephones 2987 & 3576

INDEX TO ADVERTISERS

	Page Nos.
A.E.I.-Birlec, Ltd.	—
A.E.I. Plastics (Aldridge) Ltd.	—
Acme Conveyors, Ltd.	14
Air Control Installations Ltd.	57
Albion Diemakers Ltd.	—
Albion Pulverising Co. Ltd.	—
Allan, John, & Co. (Glenpark), Ltd.	8
Alley Compressors, Ltd.	—
Amber Oils, Ltd.	—
Ambuco Ltd.	50
Anderson-Grice Co., Ltd.	—
Annealers, Ltd.	—
Armstrong Whitworth (M.I.), Ltd.	—
Ashworth Ross & Co., Ltd.	—
Aske, Wm., & Co., Ltd.	—
Associated Lead Mfts. Ltd.	—
August's, Ltd.	42
Austin, E., & Sons, Ltd.	—
Badische Maschinenfabrik A.-G.	—
Bairds & Scottish Steel, Ltd.	—
Baker Perkins, Ltd.	401
Balbardie, Ltd.	—
Ballard, F. J., & Co., Ltd.	—
Ballinger, L. J. H., Ltd.	—
Beans Industries, Ltd.	—
Beck, H., & Sons, Ltd.	46
Bennett, H. G., & Co. (Gloves), Ltd.	—
Berk, F. W., & Co., Ltd.	—
Bilston Stove & Steel Truck Co., Ltd.	—
Birkett, F. W., & Co., Ltd.	—
Birlec-Efco (Melting), Ltd.	60
Blackwell's Metallurgical Works, Ltd.	—
Boydell, E., & Co., Ltd.	16
Bradbury, John & Co. (Stockport), Ltd.	—
Bradley & Foster, Ltd.	—
British Acheson Electrode, Ltd.	—
British Aero Components, Ltd.	—
British Electrical Repairs, Ltd.	—
British Foundry Units, Ltd.	—
British Industrial Sand Ltd.	19
British Iron & Steel Federation	—
British Monorail, Ltd.	—
British Moulding Machine Co., Ltd.	36 & 37
British Resin Products Ltd.	—
British Ronceray, Ltd.	—
British Shotblast & Engineering Co., Ltd.	57
Broom & Wade, Ltd.	30
Buckland Sand & Silica Co., Ltd.	—
Burn, John, & Co. (B'ham), Ltd.	—
Burnand, W. E., & Son, Ltd.	—
Butterworth & Co., (Publishers) Ltd.	52
Canning, W., & Co., Ltd.	—
Carborundum Co., Ltd.	—
Catalin, Ltd.	—
Cawood Wharton & Co. Ltd.	54
Chapman & Smith, Ltd.	—
Ciba (A.R.L.), Ltd.	—
City Casting & Metal Co. Ltd.	—
Cleanair, Ltd.	22
Cohen, Geo., Sons & Co., Ltd.	—
Coleman-Wallwork Co. Ltd.	—
Consolidated Pneumatic Tool Co., Ltd.	—
Constructional Engineering Co., Ltd., The	59
Controlled Heat & Air, Ltd.	—
Conveyor & Shotblast, Ltd.	—
Cooke, Bailey, Ltd.	49
Cox & Danks, Ltd.	—
Crockett Lowe, Ltd.	—
Crooks, L. E.	—
Cumming, Wm., & Co., Ltd.	53
Dallow, Lambert & Co. Ltd.	—
Dependable Shell Core Machines Inc.	—
Derncliff Engineering Pattern Co.	—
Dickson, Roy Wilson, Ltd.	—
Distillers Co., Ltd., The	—
Dowler, H. J., Engineers & Pattern Makers, Ltd.	49
Dowson & Mason, Ltd.	—
Dunford & Elliott (Sheffield), Ltd.	—
Durrans, James & Sons, Ltd.	20
Dustuctor Co., Ltd.	—
Dyson, J. & J., Ltd.	40
Electrical Development Association	—
Electrogenerators, Ltd.	—
Elliott Bros. (London), Ltd.	—
Elliott, E., Ltd.	—
Engineering Services (Manchester), Ltd.	—
Ertel Ore, Ltd.	—
Escol Products, Ltd.	—
Evans, James & Co., Ltd.	51
Evans, Roy, M.I.B.F.	—
Evans, Stanley N., Ltd.	—
Eyre Smelting Co., Ltd.	56
F. & M. Supplies, Ltd.	—
Felco Hoists, Ltd.	—
Fenton Bryn & Co., Ltd.	—
Filter-Heat, Ltd.	6
Firth Cleveland Tools, Ltd.	—
Fischer, George, Ltd.	—
Fisher-Foundries, Ltd.	51
Fletcher Miller, Ltd.	38
Flextol Engineering Co., Ltd.	—
Fordath Engineering Co., Ltd.	2
Fosseo International, Ltd.	21
Foseco, Ltd.	—
Foundry Equipment, Ltd.	12 & 13
Foundry Mechanisations (Baillot), Ltd.	—
Foundry & Metallurgical Equipment Co., Ltd.	—
Foundry Plant & Machinery, Ltd.	39
Foundry Suppliers, Ltd.	25
Foxall, William, Ltd.	—
Foxboro Yoxall, Ltd.	—
Frankiss, R. J. (Patterns) Ltd.	—
Franklin Furnace, Ltd.	—
Fuel & Metallurgical Processes, Ltd.	—
Fullers' Earth Union, Ltd., The	11
Furnascote, Ltd.	—
G.W.B. Furnaces, Ltd.	—
Gas Council	—
General Electric Co., Ltd.	—
General Refractories, Ltd.	—
Goodyear Tyre & Rubber Co., Ltd.	—
Graphite Products, Ltd.	—
Great Lakes Carbon International, Ltd.	—
Green, E., & Son, Ltd.	—
Green, Geo., & Co.	—
Gregory, J. G., & Sons, Ltd.	49
Griffiths, A. E. (Smethwick), Ltd.	—
Guest, Keen Iron & Steel Works	—
Harborough Construction Co., Ltd.	29
Hargraves Bros. (Manchester), Ltd.	—
Harris & Pearson, Ltd.	—
Harvey & Longstaffe, Ltd.	—
Harvey, J. J. & Pressurecast, Ltd.	—
Hedin, Ltd.	—
Heneage Metals, Ltd.	51
Hepburn Conveyor Co., Ltd.	34
High Speed Steel Alloys, Ltd.	—
Hills (West Bromwich), Ltd.	—
Holmes, W. C., & Co., Ltd.	10
Holt, G. J. (Rochdale) Ltd.	52
Hooker, N. (Foundry Supplies), Ltd.	—
Hooker, W. J., Ltd.	—
Ilford, Ltd.	—
Imperial Chemical Industries, Ltd.	—
Incandescent Heat Co., Ltd.	28
International Combustion, Ltd.	—
J.S. Pattern Products, Ltd.	—
Jackman, J. W., & Co., Ltd.	3
Jacks, Wm., & Co., Ltd.	43
Joy Sullivan, Ltd.	18
Keith Blackman, Ltd.	—
L.M.S. Products, Ltd.	—
Lafarge Aluminous Cement Co., Ltd.	—
Leader, Dennis, Ltd.	—
Lees Hall & Sons, Ltd.	56
Leicester Lovell & Co., Ltd.	—
Levy, B., & Co. (Patterns), Ltd.	49
Lones, Joseph, Laboratories	54
Lord, E. S., Ltd.	—
Luke & Spencer, Ltd.	—
Macnab & Co., Ltd.	—
Major, Robinson & Co., Ltd.	—
Mansfield Standard Sand Co., Ltd.	—
Marco Conveyor & Eng g. Co., Ltd.	—
Marshall, Thomas (Loxley), Ltd.	—
Matthews & Yates, Ltd.	—
May, J. H., Ltd.	48
Mead, McLean & Co., Ltd.	—
Mellor Mineral Mills, Ltd.	—
Metalectric Furnaces, Ltd.	—
Metals & Equipment (Wolverhampton), Ltd.	—
Midgley & Son, Ltd.	—
Midland Monolithic Furnace Linings Co., Ltd.	57
Midland Tar Distillers, Ltd.	—
Modern Furnaces & Stoves, Ltd.	24
Molineux Foundry Equipment, Ltd.	—
Monometer Manufacturing Co., Ltd.	5
Morganite Crucible, Ltd.	26
Morris, B. O., Ltd.	—
Neville, T. C., & Sons, Ltd.	23
Newton Collins, Ltd.	—
Nicholl & Wood, Ltd.	—
Norris Equipment & Construction, Ltd.	54
North Derbyshire Metal Products, Ltd.	—
Norton Grinding Wheel Company, Ltd.	—
Norton Industries, Ltd.	53
Ormerod, R. E., Ltd.	57
Orthos, Ltd.	—
Palmer Aero Products, Ltd.	—
Parish, J., & Co., Ltd.	—
Park & Paterson, Ltd.	—
Parker Mitchell Engineering Co., Ltd.	38
Parmelee (G.B.), Ltd.	—
Passe, J. F., Co.	—
Paterson Hughes Engineering Co., Ltd.	—
Patterncrafts, Ltd.	—
Pearson, E. J. & J., Ltd.	—
Peco Machinery Sales, Ltd.	—
Perry, G., & Sons, Ltd.	—
Phillips, J. W. & C. J., Ltd.	—
Pickard, W., & Co., Ltd.	—
Pickford, Holland, Ltd.	—
Platt Metals, Ltd.	—
Pneulec, Ltd.	7
Polygram Castings Co., Ltd.	4
Precision Pressework Co., Ltd.	—
Price, J. T., & Co., Ltd.	—
Production Chemicals (Rochdale), Ltd.	—
Purimachos, Ltd.	—
Reavell & Co., Ltd.	—
Refined Iron Co. (Darwen), Ltd.	—
Reid, Wm., & Co.	56
Resinous Chemicals, Ltd.	—
Richards Structural Steel Co., Ltd.	49
Richardson Eng'g., Ltd.	—
Richarsons Moss Litter Co., Ltd.	—
Richardsons, R. J., & Sons, Ltd.	—
Ridsdale & Co., Ltd.	—
Robinson, Thos., & Son, Ltd.	—
Robson Refractories, Ltd.	—
Roper, E. A., & Co., Ltd.	—
Rowland, F. E., & Co., Ltd.	17
Rule & Moffat	—
Rustless Iron Co., Ltd.	—
Safety Products, Ltd.	—
Salter, Geo., & Co., Ltd.	—
Schieldrop & Co., Ltd.	—
St. George's Engineers, Ltd.	—
Sheffield Smelting Co., Ltd.	—
Sheppard & Co., Ltd.	55
Sieber, J., Equipment Co., Ltd.	—
Sintokogio, Ltd.	—
Smedley Bros., Ltd.	57
Smeeton, J. A., Ltd.	—
Smith, A., & Co.	57
Smith, A. (S. & B. Foundry Sands), Ltd.	—
Smith, John (Keighley) Ltd.	—
Smiths Motor Accessories, Ltd.	—
Soles, J. M.	—
Spencer & Halstead, Ltd.	33
Spermolin, Ltd.	—
Stansby, W., & Co., Ltd.	—
Stanton & Staveley Sales, Ltd.	35
Steels Engineering Installations	—
Stein, John G., & Co., Ltd.	—
Stephens, Wm. & Sons, Ltd.	—
Sterling Foundry Specialties, Ltd.	31, 32 & 54
Sternol, Ltd.	—
Stone, J., & Co. (Propellers), Ltd.	55
Stone Marine Engineering Co., Ltd.	55
Suffolk Iron Foundry (1920), Ltd.	—
Sutcliffe Speakman, Ltd	6
Taylor, J. (Syston), Ltd.	—
Thomas, G. & R., Ltd.	—
Thomas, Gwyn, & Co.	—
Thompson, John, Instrument Co., Ltd.	—
Thomson & McIntyre	—
Thor Tools, Ltd.	—
Tilghman's, Ltd.	9
Union Carbide, Ltd.	—
United Fireclay Products, Ltd.	—
United States Metallic Packing Co., Ltd.	—
Wagner Heinrich, Maschinenfabrik	—
Wal-Met Alloys Co.	15
Walker, L. & L., Ltd.	—
Ward, Thos. W., Ltd.	1
Warner & Co., Ltd.	—
Warrington Red Moulding Sand Co.	—
Watsons (Metallurgists) Ltd.	—
West Midland Refining Co., Ltd.	27
Wild-Barfield Electric Furnaces, Ltd.	403
Wilkinson Rubber-Linatex Co., Ltd.	—
Wilson Crucible Co., Ltd.	56
Witham, L. A., & Co.	—
Woodward Bros. & Copelin, Ltd.	52

Published by the Proprietors, Industrial Newspapers (Fuel & Metallurgical), Limited, John Adam House, 17/19, John Adam Street, London, W.C.2, and printed in Great Britain by Harrison & Sons, Limited, by Appointment to Her Majesty The Queen, Printers, London, Hayes (Middx) and High Wycombe.

TITAN
FOUNDRY PLANT

THE PAST - CONSTRUCTIONAL have supplied Cupolas under the "TITAN" trade mark to all parts of the world.

THE PRESENT - CONSTRUCTIONAL are supplying Cupolas to customers in this country and overseas, both Cold Blast and Hot Blast installations, utilising either independently fired or recuperative blast heaters.

THE FUTURE - CONSTRUCTIONAL offer a full range of Melting Plant complete with mechanised handling facilities; Cold Blast Cupolas, Hot Blast Cupolas with either independently fired or Recuperative Blast Heaters, oil fired or electric receivers.

CUPOLAS

THE CONSTRUCTIONAL ENGINEERING Co LTD

TITAN WORKS · CHARLES HENRY ST. : BIRMINGHAM 12.

PHONE MIDLAND 4753-4
GRAMS STRUCTURAL

A MEMBER OF THE B.H.D. ENGINEERS LTD. GROUP

FOUNDRY TRADE JOURNAL

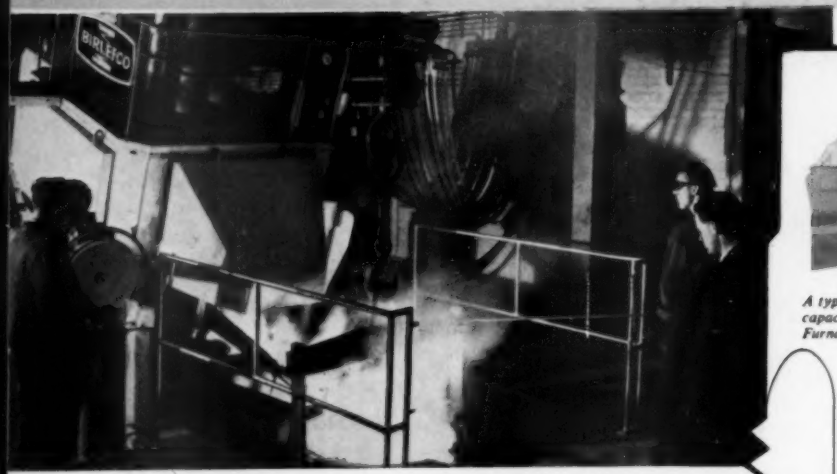
EST. 1902

WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

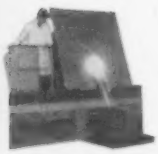
VOL. 111
No. 2338
Registered at the G.P.O. as a Newspaper

SEPTEMBER 28, 1961
Offices: John Adam House, John Adam St., London, W.C.2

Single Copy 1/-. By Post 1/4. Annual Subscription, Home 52/-, Abroad 60/- (Prepaid)



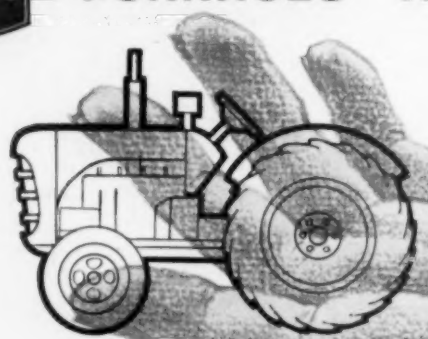
Pouring from a Birlefco 3 ton capacity Arc Furnace.



A typical Birlefco 10 cwt. capacity High Frequency Furnace

BIRLEFCO

FURNACES AS BIG OR SMALL AS THE JOB IN HAND



Whatever your production demands Birlefco can provide the most suitable melting equipment, be it a few hundredweights of special tool steel or bulk steel production for agricultural machinery and earth-moving equipment. If there's metal to be melted, Birlefco present a unique combination of design, experience and manufacturing skill, always abreast of new trends and new techniques.

Specialists in all types of melting equipment; Arc Furnaces from 1 to 150 tons capacity; Mains Frequency and High Frequency Melting Plant from 10 lbs to 20 tons capacity; Induction Heating Equipment.

BIRLEC-EFCO (MELTING) LTD Westgate · ALDRIDGE Staffs Telephone Aldridge 52071

Manufactured in Australasia: Birlec-Major Pty Ltd., Moorabbin, Victoria, Australia. In Canada: Birlefco-Lindberg Ltd., Toronto
In India: AEI (India) Pvt. Ltd., Calcutta. In South Africa: AEI South Africa (Pty) Ltd., Johannesburg SM/BE.6505